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SALPINGITIS*

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AS the subject of my communication for our mutual discussion I have selected inflammation of the uterine adnexa, and I have done so for various reasons. In the first place, it is a common meeting ground of the general and pelvic surgeon, and on the question of treatment the policy of the former is by no means always identical with that of the latter. Secondly, in its more chronic phases, the diagnosis of tubo-ovarian inflammation from other pelvic lesions, *e.g.*, pelvic appendicitis, ovarian or pelvic endometriosis, and pelvic tuberculosis, raises difficulties with which many of us are familiar and which certainly invite discussion. Lastly, salpingitis is common, and in general it is always more profitable to discuss common lesions than rarities which, however interesting in themselves, are not of such practical importance.

A few years ago it fell to my lot, in the short space of twelve months, to re-open ten abdomens where a so-called "chronic appendix" had previously been removed, and a deep-seated inflammatory lesion in the pelvis overlooked. I do not blame the original surgeons for removing the appendix, but what I do blame them for was not previously satisfying themselves that all was well in the deeper parts of the pelvis. I cannot overestimate the value of vaginal or combined recto-vaginal investigation in the diagnosis of cases where the diagnosis is in doubt, and when the patient's symptoms are all too frequently of little specific value. There are no such simple criteria as the well-known and often quoted statements that (*a*) epigastric discomfort in association with lower abdominal pain implies inflammation of the appendix; (*b*) that vomiting usually eliminates the possibility of tubo-ovarian inflammation; (*c*) that left- as well as right-sided iliac pain favours a diagnosis of salpingitis as opposed to appendicitis; (*d*) that cutaneous hyperæsthesia in the right iliac fossa is evidence of appendical inflammation; and so on. In practice exceptions to the above are always turning up, proving that the final opinion in a given case should be based, not upon the clinical history or symptoms but upon the results of a careful pelvic, as well as abdominal, examination, conducted, if necessary, under general anæsthesia. The presence of a small, deep-seated and adherent inflammatory tubo-ovarian swelling, whilst readily appreciated by the pelvic route, is easily overlooked when reliance is placed upon purely abdominal methods. Similarly, the recognition of thickening at the upper part of the recto-vaginal septum, and especially puckering of the posterior vaginal fornix such as occurs with endometriosis and peritubal adhesions in this situation, should prevent many a harmless appendix from being removed.

With acute lesions diagnosis is of still greater importance, as an error may cost the patient her life. I make this statement with full appreciation of its seriousness, as the treatment of acute pelvic peritonitis of tubal origin differs essentially from that of acute appendicitis. If it should happen that a wrong diagnosis has been made, things can be done

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or left undone which may be followed by most unfortunate sequelæ. I refer to the danger associated with the approach to, and removal of, an acutely inflamed tube of streptococcal origin, or the tapping of a streptococcal abscess per abdomen to the exclusion of the safer vaginal route.

In the chronic group of tubo-ovarian lesions there will always be cases, even after careful and thorough investigation, where the diagnosis remains obscure. Such are instances of inflamed appendages, possibly secondary to an infected abortion, where one or other tube is adherent high in the pelvis and out of reach of the examining finger. Chronic right- or left-sided iliac pain is often the only symptom. In such an exploratory laparotomy is indicated, but let the incision be vertical in the mid-line above the pubes. Only by this approach is it possible easily to explore by touch and vision the pelvic organs and the bottom of Douglas' pouch. Should the lesion prove after all to be appendical it can be dealt with quite satisfactorily through such an incision. On the other hand, if chronic appendicitis is suspected and the lesion should prove to be of tubal origin exploration of the deeper parts of the pelvis is difficult and unsatisfactory with the old "gridiron" incision in the right iliac fossa. The "Battle" or "right para-rectus" incision is adequate for dealing with lesions of the right uterine appendage or appendix, but may render approach to the left tube and ovary unnecessarily difficult.

From the point of view of treatment, I think, perhaps, that it will be most useful to discuss the problem under two headings, *viz.*, (*a*) acute and subacute infections of the Fallopian tube, and (*b*) chronic inflammatory lesions of the uterine adnexa.

ACUTE SALPINGITIS

Acute inflammation of the Fallopian tube may occur as a primary lesion or as the result of recrudescence or secondary infection of a pre-existing inflammatory lesion. This distinction is important, since, in the latter the extent of the conflagration is usually limited by extensive adhesions which in the former are commonly non-existent. It follows, therefore, that in severe primary infections there is a real danger of extension of the trouble to the general abdominal cavity, a risk which may be increased by injudicious methods of treatment. It is, I think, an accepted fact that the pelvic peritoneum is possessed of high powers of resistance to infection. This resistance diminishes rapidly in the general abdominal cavity, and, therefore, it should be our aim to limit the infection to the pelvis. An illustration of this fact is to hand in the grave results which attend tubal and peritoneal infection of puerperal origin when the uterus is still an abdominal organ.

Another factor to be considered is the nature of the infecting agent. The organisms responsible for acute tubal lesions usually fall under one of three headings, *viz.*, gonococci, streptococci, and "coliform" bacilli. Gonococcal infections are, perhaps, the least worrying in their immediate effects. Given time and palliative treatment, the majority subside, and the organisms die, the result being nothing more than closed tubes, a mass of pelvic adhesions, and associated chronic pelvic pain, which may eventually call for surgical treatment at a later but safe period. Streptococcic and coliform lesions, on the other hand, generally necessitate active interference during the acute stage. What should this interference be? My answer to you is drainage. The problems we have to consider in relation to the "acute tube" are, therefore, when should this be done, and how should it be done? My own policy is to delay active interference as long as possible, to do as little as possible, and as quickly as possible.

Nothing, in my opinion, is more dangerous in the presence of acute tubal inflammation than to embark upon a laparotomy involving the separation of such adhesions as exist, in an attempt to reach and remove an infected appendage. I learnt this fact quite early in my career. Fresh from the experience of dealing with acute appendical infection, I attempted to apply the same principles to acute lesions of the Fallopian tubes, and with disastrous results. It happened that the first three cases so treated were acute pyosalpinx of streptococcal origin. The Fallopian tubes were removed by the abdominal route, and all three patients died from streptococcal peritonitis. This taught me a very sound lesson! It made me appreciate the virulence of the infection that may lurk in an acute tube, and to approach the problem by methods other than

those with which I was already familiar. Also it made me recognize the fact that acute inflammation of the appendix and acute inflammation of the Fallopian tube are two entirely different problems which cannot be dealt with by a common policy. I have no doubt, now, that the safest course is not to remove uterine appendages when they are acutely inflamed. I am equally sure that the proper treatment is to provide free and adequate drainage when it is obvious from the clinical course of a case that the infection is not subsiding. This implies that there is frequently not the same urgency for surgical interference in the case of the acutely inflamed tube as exists with the acute appendix. Within reason, time is to the patient's advantage when infection is limited to the pelvis, in that it allows nature to erect a barrier to shut off the comparatively safe pelvis from the dangerous general peritoneal cavity. The importance of correct diagnosis, is, therefore, of paramount importance.

Let me next direct your attention to the route by which drainage should be effected. My own preference is for vaginal drainage through the posterior fornix whenever it is possible. There is no risk of infection of the general peritoneal cavity, drainage is effected at the lowest point, and there is no great disturbance of the inflamed tissues. The operation is not difficult, even in the case of double acute pyosalpinx, unless the affected tubes happen to be adherent at the level of the pelvic brim, when, naturally, an abdominal approach is preferable. When clinical evidence is available that infection of the peritoneum above the pelvic brim already exists, then laparotomy should be carried out by a small supra-pubic median incision, and drainage effected by carrying a split rubber tube down into Douglas' pouch between the affected uterine appendages. If pus is oozing from the Fallopian tubes, no attempt should be made to remove them. Bourne's plan of incision and drainage of the ampullary portion is, in my experience, correct, not because it may result later in a physiologically healthy appendage—a remote possibility—but because there is less disturbance of the tissues, and, consequently, less danger to the patient.

When an acute tubal infection has not resolved, either as the result of palliative measures or surgical drainage, but has ended in abscess-formation, the course of treatment is comparatively simple. The pus must, of course, be evacuated and the cavity drained. Fortunately, the majority of these abscesses locate themselves in Douglas' pouch and are easily reached by posterior colpotomy. There is no more simple and satisfactory operation than the drainage of a large pelvic abscess by this route, and the ultimate results are often surprisingly good. I refer you to Table I which gives the results of 33 cases of acute pyosalpinx and pelvic abscess treated in my Clinic by this method. You will notice that the immediate mortality is nil. It is interesting also to find that amongst 18 patients where pregnancy was possible 3 subsequently became pregnant. One woman, indeed had three children after a large pelvic abscess had previously been drained *per vaginam*, showing that irretrievable damage is not necessarily done to physiological function by the occurrence of suppuration in the pelvis. Fourteen patients out of 22 reported themselves as physically fit at least five years after operation, and in only one case had a second operation been necessary.

Referring to the cases of abdominal drainage (Table II) one operative death is recorded in a series of 25. Here again, it will be seen that 2 patients reported the fact of subsequent pregnancy. The percentage of cases requiring later operation is, however, higher in the abdominal than in the vaginal group, and the general standard of subsequent health does not appear to be so good.

The risk attached to removal of an acutely inflamed appendage is shown in Table III, where three deaths are recorded. This table does not include the deaths to which I have already referred, and which occurred at an earlier date. I may add, however, that the mortality in the table is entirely associated with acute and not chronic cases.

Palliative treatment.—What is the position of purely palliative measures in relation to acute salpingitis? It is, perhaps, a little difficult to reach a correct opinion when the matter is viewed from a British hospital standpoint. The virulence of infection usually dominates the situation, and of the cases admitted to our voluntary hospitals the majority of women are suffering from severe lesions where operation is imperative. Accommodation is not possible for

the less acute infections, and such patients are generally treated at home or referred to other institutions where the bed problem is not one of such pressing importance. There is no doubt, therefore, that a large number of patients in Great Britain are, for this reason, not seen in the first instance by the gynæcological surgeon.

Under the influence of ordinary palliative measures, rest, application of heat, saline purgation, and so forth, many cases of subacute salpingitis subside, at any rate for a time. Later, the gynæcologist sees the result of infection in the shape of closed tubes, associated with chronic pelvic pain, dyspareunia, etc., but only when the case has passed into the chronic phase. In this respect salpingitis and appendicitis have something in common. Acute virulent infections bring the patient to hospital at once. Subacute infections are only brought to our notice when by reason of repeated attacks or the persistence of symptoms additional help in treatment is required.

SUBACUTE SALPINGITIS

Let us consider for a few moments the management of these subacute cases. They are not by any means easy problems, for there is always the danger that by too vigorous treatment infection may be spread. Immediate surgical intervention has no place in the treatment of subacute salpingitis. Drainage is not called for, and removal of the affected tubes may not only be unnecessary but actually dangerous. In recent years my practice, in common with others dealing with cases of this type, has been to apply heat *per vaginam* by means of the Elliott apparatus. There is nothing new in the application of heat to pelvic inflammatory lesions. In the old days, and also today, when other means are not available, the hot vaginal douche holds an honoured place. When it is employed, my only comment is, let it be hot enough, let it be copious enough, and let it be frequently administered. To produce any material effect, douching should be repeated at least every four hours.

Appreciation of the good effects of sustained heat applied *per vaginam* to the pelvic organs and of the inconvenience attached to ordinary vaginal douching has led to the introduction of newer methods of attaining the same end. When visiting a large clinic in Amsterdam I was shown a number of cases of subacute salpingitis being treated with infra-red rays, by means of vaginal applicators. There is nothing very special about infra-red light, as many of you know. It is merely a spectacular method of applying heat easily and efficiently. The Elliott apparatus I regard as another modern luxury method; it has the advantage that heat generated by electricity can be diffused throughout the pelvis at a progressively increasing temperature, and for as long as may be desired in the individual case.

CHRONIC SALPINGITIS

There remains for consideration the treatment of what I may call "the chronic tube". In this category we include not only examples of chronic pyosalpinx and hydrosalpinx, but also cases of densely matted and adherent uterine appendages, with much thickened tubal walls—so-called "chronic interstitial salpingitis". These are the aftermath of acute lesions, or the result of infection by less virulent strains of organisms than are responsible for the troubles we have been discussing.

There is one essential difference between acute and chronic salpingitis, *viz.*, that in the latter the infecting agent has generally shot its bolt and is dead. There is, therefore, very little if any danger attached to the escape of pathological fluids from a chronic pyosalpinx in the course of removal of the affected tube.

The treatment of chronic salpingitis suggests a variety of topics for profitable discussion. In the first place I think that I may put the question, is surgical treatment preferable to non-surgical or palliative measures? In the presence of gross lesions I have no hesitation in strongly advocating the former. Once a Fallopian tube has been so damaged by chronic inflammation that it is palpable *per vaginam* or *per rectum* as a swelling in one or other posterior quadrant of the pelvis, it never, in my experience, recovers. Moreover, its presence is a constant menace to the comfort and well-being of its unfortunate possessor. Ladies of leisure, and those who, perhaps, do not mind a life of semi-invalidism, may prefer "the ills that be"—etc., but to the woman who has to take an active part in the affairs of life, the presence of a "chronic tube" usually spells disaster. The occurrence of constant pelvic pain, profuse and painful menstrua-

tion, dyspareunia, etc. usually, in the case of the working woman, decides the issue.

The next point we have to consider, if the axiom is accepted that surgical treatment is indicated, is the nature of this intervention. Here I submit that laparotomy is the operation of choice. There is no place in my opinion for vaginal methods, although I know that vaginal hysterectomy with removal of inflamed appendages is practised by the Viennese school of pelvic surgeons. The extirpation of a chronic tube may prove to be a very trying procedure. Indeed, I know of no more difficult operation than is sometimes involved in the dissection of tubes densely adherent to adjacent viscera. Fortunately, this is not always the case, as when the correct plane of separation is located chronic inflamed uterine appendages of long-standing may, on occasion, be enucleated without difficulty. This fact cannot, however, be ascertained beforehand, and, therefore, to my mind, the abdominal route is to be preferred in all cases.

In spite of possible difficulties to which I have referred the removal of chronically inflamed tubes *per se* is by no means a dangerous operation. This is shown in Tables III and IV. In a series of 53 consecutive cases of chronic salpingitis (including pyosalpinx and hydrosalpinx) both tubes were removed with no mortality. In Table III covering 92 cases of unilateral salpingectomy it will be noted that 3 women died. These, however, were acute cases, and the danger of such intervention has already been emphasized. Eliminating the deaths associated with acute lesions, it is possible to submit a combined series of 142 consecutive cases of salpingectomy with no mortality. I think, therefore, we may regard it as a safe procedure.

The true value of treatment can, however, only be judged by its ultimate results, and certain information is obtained in the records of the "follow-up" contained in the tables which I submit. You will see from the "questionnaire" the type of information which we desired to obtain. Without going into detail it will be useful to refer to one or two matters of practical value. It is important to know, *e.g.*, whether removal of one or both tubes is sufficient to restore a woman to good health, such that she is able to take her place as a useful member of the community. Taking Tables III and IV together, you will note that out of 99 replies, approximately 83 per cent reported that they were in good or fair health. The failures in this respect registered approximately 16 per cent; 76 per cent were able to carry out their full duties; another 20 per cent undertook light work; and 3 per cent only were incapacitated. These figures, however, should also be taken in conjunction with the necessity or otherwise for treatment subsequent to the initial operation. It will be seen on reference to the appropriate heading that of 67 cases where one tube only was removed 13 later required additional treatment. This varied from "expectant" or "palliative", in the case of 5, to hysterectomy in 6, and removal of the remaining appendage in 1. Amongst 31 double salpingectomies hysterectomy was subsequently required in 4, owing to the persistence of pelvic pain. In other words, we may say that in 17 patients out of a total of 98 the original operation had been incomplete. It had been safe so far as mortality was concerned, but is it justifiable to argue that it is best if it involves the possibility of additional treatment later in approximately 17 per cent of cases so treated? What is the alternative? The answer is, hysterectomy with removal of both tubes. Now, hysterectomy may be a very serious proposition when it is performed for the radical cure of chronic inflammatory disease of the female pelvic organs. The successful removal of long-standing double pyosalpinx, together with the uterus, the whole being densely adherent to all adjacent tissues, can be one of the most difficult operations in pelvic surgery. In my opinion, it is definitely more troublesome than hysterocolpectomy for cervical carcinoma. It is not surprising, therefore, that the procedure is associated with a higher rate of mortality than is associated with hysterectomy performed for other reasons, for example, fibroids. In a series of 137 hysterectomies, total and sub-total, performed in my clinic between the years 1911 and 1923 for diseased appendages, and recorded in a communication to the British Congress of Obstetrics and Gynæcology in Manchester, 1927, the immediate mortality was 7.5 per cent. During the same period the initial mortality in the case of 250 conservative operations was 1.2 per cent only. During the next 10 years, *i.e.*, up to 1933, my registrar informs me that only 30 hysterectomies for pelvic inflammatory disease have been performed. During the same period 243 cases

THE AFTER-RESULTS OF 244 CASES OF SALPINGITIS TREATED AS IN-PATIENTS AT THE GENERAL HOSPITAL, BIRMINGHAM, ENGLAND, FROM 1913 - 1932 (INCLUSIVE) BY CONSERVATIVE METHODS

The figures contained in the following Table are compiled from answers to the attached "Questionnaire" and show the state of health after periods varying from 5 to 20 years from the initial treatment.

TABLE I.

PELVIC ABSCESS & ACUTE PYOSALPYNX, 1913-32

Treated by Posterior Colpotomy and Drainage

TOTAL CASES 33

MORTALITY	Immediate	0		
	Remote	1	(6 years after operation)	
PRESENT HEALTH	Good	14		
	Fair	4		
	Poor	4		22
CAPACITY FOR WORK	Normal	15		
	Light	6		
	Nil	1	(due to amp. of leg later)	22
PREGNANCY	Full-term	3	(1 pregnancy 1) (2 " 1) (3 " 1)	
	Abortion	0		
	Nil	15		18
MENSTRUATION	NORMAL	9		
	Menorrhagia	6		
	Menorrhalgia	4		
	Amenorrhœa	5		24
VAGINAL DISCHARGE	Present	6		
	Absent	16		22
DYSPAREUNIA	Present	2		
	Absent	20		22
SUBSEQUENT TREATMENT	Nil	21		
	Required	1		22

TABLE II.

PELVIC ABSCESS, 1913-32

Treated by Abdominal Drainage only

TOTAL CASES 25

MORTALITY	Immediate	1		
	Remote	1	(3 years later)	2
PRESENT HEALTH	Good	9		
	Fair	5		
	Poor	0		14
CAPACITY FOR WORK	Normal	11		
	Light	3		
	Nil	0		14
PREGNANCY	Full-term	2	(1 case—1 pregnancy) (1 " —2 ")	
	Abortion	0		
	Nil	5		7
MENSTRUATION	NORMAL	12		
	Menorrhagia	1	(slight)	
	Menorrhalgia	1		
	Amenorrhœa	0		14
VAGINAL DISCHARGE	Present	2		
	Absent	12		14
DYSPAREUNIA	Present	3		
	Absent	11		14
SUBSEQUENT TREATMENT	Nil	9		
	Required	5		14

TABLE III.

SALPINGITIS & PERIMETRITIS 1913-32

Treated by removal of one Appendage only

TOTAL CASES 92

MORTALITY	Immediate	3	(acute)	
	Remote	1		4
PRESENT HEALTH	Good	36		
	Fair	20		
	Poor	12	(1 in Aslyum)	68
CAPACITY FOR WORK	Normal	50		
	Light	15		
	Nil	3		68
PREGNANCY	Full-term	13	1 gestation—5 cases 2 " —5 " 3 " —1 case 4 " —1 " 5 " —1 "	
		4	(amongst above 12 fertile patients)	
	Abortion			
	Nil	50		63
MENSTRUATION	NORMAL	32		
	Menorrhagia	10		
	Menorrhalgia	13		
	Amenorrhœa	17		72
VAGINAL DISCHARGE	Present	21		
	Absent	46		67
DYSPAREUNIA	Present	20		
	Absent	47		67
SUBSEQUENT TREATMENT	Nil	54		
	Required	13	6 subsequently had Hysterectomy 1 " " remaining appendage removed 1 " operation for "Appendicitis"	
		5	treated "expectantly"	

TABLE IV.

CHRONIC SALPINGITIS, 1913-32

Treated by removal of both Tubes but not Uterus

TOTAL CASES 53

MORTALITY	Immediate	Nil		
	Remote	Nil		
PRESENT HEALTH	Good	21		
	Fair	6		
	Poor	4		31
CAPACITY FOR WORK	Normal	26		
	Light	5		
	Nil	0		31
PREGNANCY	Full-term	0		
	Abortion	1		
	Nil	9		10
MENSTRUATION	NORMAL	21		
	Menorrhagia	2		
	Menorrhalgia	2		
	Amenorrhœa	8		33
		N.B. Includes 2 cases of Ovarian Grafts in Rectus Muscle. In 1 case Menstruation was normal for 7 years.		
VAGINAL DISCHARGE	Present	8	("1 v. bad")	
	Absent	23		31
DYSPAREUNIA	Present	9		
	Absent	22		31
SUBSEQUENT TREATMENT	Nil	27		
	Required	4	(Hysterectomy for Pelvic pain)	31

TABLE V.

SALPINGITIS, 1913-32

Treated by Salpingostomy

TOTAL CASES 15

Nil		
Nil		
7		
1		
4	12	
10		
2		
0	12	
0		
0		
9	9	
including 2 cases of tubal grafting		
7		
3		
1		
2	13	
3		
9	12	
2		
10	12	
8		
4	12	
2nd operation required in 3 cases for Salpingitis and 1 for non-pelvic condition.		

TABLE VI.

SALPINGITIS & PERIMETRITIS 1913-32

Treated by Laparotomy and separation of adhesions only

TOTAL CASES 13

1		
1	2	
3		
2		
3	8	
5		
3		
0	8	
3	1 gestation—2 cases	
2	" —1 case	
1 (amongst above 2 fertile patients)		
4	7	
3		
1		
1		
3	8	
4		
4	8	
5		
3	8	
5		
3	2 treated by expectant methods and both became pregnant. 1 had Amenorrhœa after 2nd operation, presumably Hysterectomy.	

TABLE VII.

PELVIC INFLAMMATION

Treated without operation

TOTAL CASES 13

Nil		
Nil		
6		
1		
3	10	
7		
1		
2	10	
4 (3 cases 1 gestation)		
(1 case 2 ")		
0		
2	6	
7		
1		
4		
1	13	
3		
7	10	
3		
7	10	
7		
3	10	

TABLE VIII.

PELVIC INFLAMMATION

Summary of Results of Conservative treatment

TOTAL CASES 244

MORTALITY	Immediate	5	
	Remote	5	10
PRESENT HEALTH	Good	96	
	Fair	39	
	Poor	30	165
CAPACITY FOR WORK	Normal	124	
	Light	35	
	Nil	6	165
PREGNANCY	Full-term	25	
	Abortion	6	
	Nil	94	125
MENSTRUATION	Normal	91	
	Menorrhagia	24	
	Menorrhalgia	26	
	Amenorrhœa	36	177
VAGINAL DISCHARGE	Present	47	
	Absent	117	164
DYSPAREUNIA	Present	44	
	Absent	120	164
SUBSEQUENT TREATMENT	Nil	131	
	Required	33	164

GENERAL HOSPITAL,

BIRMINGHAM, ENGLAND

Gynæcological Department

FORM OF "QUESTIONNAIRE"

Name.

What is the present state of your health?

Are you able to carry out your usual work, household or otherwise?

If married, have you become pregnant since the operation?
If so, how many times?

Have you had any Miscarriages since your operation?

Are your Monthly Periods excessive or painful?

Have you at present any discharge from the front passage?

Have you any pain on connection with your husband?

Have you been treated at any other Hospital since you left the General Hospital?

Have you had any more operations?
If so, where?

(both acute and chronic) have been treated by less drastic methods. It is interesting to find that none of the hysterectomies were lost, whilst the immediate mortality from the 243 other operations was only 0.8 per cent higher, *viz.*, 2.0 per cent. The combined initial mortality for the old series of 387 cases was 2.5 per cent; for the new series (273 cases) it is 1.8 per cent. The difference is entirely accounted for by the reduction in the number of hysterectomies performed in my clinic since the Manchester Conference. It was somewhat disturbing to know that every time I performed a radical hysterectomy for double pyosalpinx I was facing a possible initial mortality of over 7 per cent. Since that time hysterectomy in these inflammatory cases has not been performed nearly so frequently. Cases have been selected more carefully, and the major operation carried out only if, and when, absolutely necessary. Another factor which may have contributed to the lower mortality is a change of technique in the more difficult cases. I now use the method advocated by Munro Kerr, of Glasgow, of splitting the uterus into two halves and removing each half separately from below upwards. An adherent appendage can be separated more easily from the pelvic colon and pelvic wall from below than from above, and there is, consequently, less risk of damaging adjacent viscera. In a really difficult case this technique is well worthy of adoption.

Once the pelvis is safely and thoroughly cleared of both uterus and diseased appendages, there is no doubt that the patient is the better for it. In 15 out of 16 replies received in my later series we found that the women could carry out their normal duties. No additional treatment had been required in any instance. The case, in fact, was finished. The problem I put to you, therefore, is, should our policy be to face greater immediate risk and attempt to reduce the mortality attached to the radical operation, or be satisfied with a comparatively safe method, even if it does involve the possibility of later intervention in 17 per cent of cases?

UNILATERAL SALPINGITIS

Many of us are familiar with the occasional case which at operation presents the picture of a grossly damaged tube on one side with a less obvious lesion or an apparently healthy organ on the other. The correct procedure under these conditions is rather a difficult problem, for in ascending infections we know only too well that inflammation of the second tube commonly follows a severe lesion in the first. It is very disturbing, however, both for patient and surgeon to be faced with the possibility of a second laparotomy within a few months of the first. Should both tubes, therefore, be removed at once on the basis that number two is practically certain to be involved later on?; should an attempt be made to sterilize the second tube by the injection of an antiseptic, *e.g.*, acriflavine?; or should the surgeon be content in dealing with what he actually sees? Personally, I find the question difficult to answer, especially as I have had to operate on more than one occasion for subsequent infection of a second tube. I am not satisfied with the proposition to attempt sterilization of the second tube and uterine cavity at the time of the first operation, for I do not think that it is possible, although the technique is easy. I am almost convinced, therefore, that double salpingectomy is justifiable in the presence of a severe lesion in one tube, even if the other does not exhibit any gross lesion. Such patients, in my experience, are commonly sterile, even if the remaining tube is left (70 per cent in my series), and it seems to me better practice to safeguard the ovary or ovaries from the possibility of recurrent serious inflammatory lesions than to adopt the rôle of an optimist, which in this instance is hardly justifiable. Twenty-four per cent in my series of unilateral salpingectomies required later treatment. I need hardly emphasize the importance of explaining the position fully to the patient and her husband before the problem has to be faced in the operating theatre. It is obvious that the point at issue may then be decided by considerations other than purely medical. To perform an operation which sterilizes a patient against her knowledge, even if it is to her medical advantage, is, of course, grossly improper.

CONSERVATIVE OPERATIONS ON THE FALLOPIAN TUBE

Finally, I come to the question of conservative operations upon the Fallopian tubes, but I do not intend to weary you with it at length, I know that some gynæcological surgeons wax

eloquent upon the possibilities of conservative surgery applied to the Fallopian tube. I can only tell you that my personal experience of salpingostomy and tubal grafting is such that I do not feel justified in advocating it. Possibly my experience is not large enough, or my methods are incorrect, for out of 15 salpingostomies (Table V) not a single patient subsequently became pregnant. Moreover, in three of these patients a second operation was necessary at a later date to remove the tubes on account of persistent pelvic pain. The trouble with salpingostomy and, for that matter, with tubal grafting also, is that, even if patency of the upper genital tract is successfully effected at the time of operation, adhesion of surfaces occurs subsequently and the purpose of the operation is undone. Possibly the use of papain, recently introduced, may prevent this danger and improve the results of an operation which I now very rarely perform.

Since the narrowest part of the Fallopian tube is the isthmic portion and closure of the lumen is common at this site, it follows that tubal grafting should have greater possibilities than a simple salpingostomy. Those who have done many of these cases tell us that they have had successes. Personally, I can only remember two instances where pregnancy followed the grafting of both tubes into the uterine wall. I have performed many operations where the result has been otherwise, and my present position is that whilst I regard a physiological result as possible from tubal grafting I think it is improbable. We must always remember that whilst our successes remain prominently before our minds, we only too frequently forget our failures. It is only when our registrars get busy and bring to light the results of treatment over a period of years, that our "swans" become "geese", and we find that at best we are but very ordinary exponents of our art.

THE PLACE OF RADIUM IN TREATMENT OF CANCER*

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THE recent prospecting for mineral riches in Canada foreshadows enormous reserves of radium. Veins are known from which it is estimated that tens of kilograms of this metal could be extracted. Canada seems to be taking the first place in its production. The friends of this country rejoice in its good fortune, which permits it to foresee matchless equipment for curietherapy. As it is especially in the treatment of cancer that the use of such large quantities is contemplated, the time seems favourable to discuss the place of this agent in cancer therapy.

THE PROGRESS REALIZED IN RADIOTHERAPY OF CANCER

One cannot analyze the progress made in the last 35 years, that is to say, since the discovery of radium by Pierre and Marie Curie entered into the medical armamentarium, without at the same time relating the history of the development of roentgen therapy, for these two branches of radiology have had a parallel development, reciprocally benefiting by the progress made either by one or the other. So far as the treatment of cancer is concerned, these are two methods which result in the same biological effects, through the use of agents very similar in their physical nature, especially since Dominici demonstrated the advantage of utilizing the "ultra-penetrating" rays of radium, namely, the γ rays alone.

The many new facts which have accelerated the evolution of radiotherapy in cancer have been gained from three principal fields of research: (*a*) radiobiology, or the study of the mechanism of action of the rays on living elements; (*b*) radiosensitivity of cancer, a new chapter in the physiopathology of tumours; (*c*) the adaptation of the material to technical ends, which has profited by the results obtained in the two preceding approaches.

Certain articles or regulations in regard to the radiotherapy of cancer have gradually de-

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veloped. It is generally accepted today that radiation principally exercises a direct action at the moment of its absorption in the cells, whose structure it disintegrates; it is also admitted that the average quantity of radiation necessary to provoke complete destruction of the cells varies with each type of cell; and, finally, that the disappearance of a cancerous cell will result from the absorption of this average quantity of radiation according to its radiosensitivity, and that the radiation must be equally distributed to all the constituent elements. In the presence of a malignant tumour the specialist must begin immediately the studies which will furnish him the three essential facts of the problem—the histological variety, the site, and the extent of the lesion.

In the case of a tumour of a common variety the *histological diagnosis* usually permits one to estimate approximately the degree of radiosensitivity. At the same time it furnishes important information as to the character of the malignancy, the probable speed of the disease, and the chances of metastases.

According to the *site,* the radiologist calculates the percentage of radiation capable of reaching the deepest part of the tumour. The task of bringing about the absorption of the mean quantity of radiation necessary determines the quality of the radiation and the portals of entry to be used. These last are chosen with a view to concentrate the rays on the diseased territory, but also to avoid injury to normal sensitive organs, which it is useful and sometimes necessary to respect.

The more or less great *extent* of the territory invaded, and hence necessary to treat, influences in its turn the dimensions and the number of fields. The obligation to avoid severe general reactions, which can result from a too large extent of irradiation, likewise leads to a choice in the quality of the radiation to be utilized, as well as in the fractioning and distribution of the doses. Over the course of years, more and more complicated apparatus has been placed in the hands of the radiologists, furnishing them with an intense flow of rays, either very absorbable or very penetrating.

THE DISPARITY BETWEEN ROENTGEN- AND CURIE-THERAPY

The cure of a cancer may be obtained with radiation by two different techniques: (*a*) caustic destruction; (*b*) selective sterilization. In the first case, the rays bring about the necrosis of all the tissue included in the field, whatever the type or nature. One can easily produce this phenomenon by causing the absorption in an organ of a large quantity of soft rays; but the long wave-length of these rays causes their absorption only to a slight depth. Hence this procedure is only applicable, practically, to those varieties of tumours which are superficial, well limited, small, and of little thickness. Selective sterilization proposes to cause the death of neoplastic cells, while respecting as much as possible the normal elements. It relies upon a definite difference between the radiosensitivity of the more resistant healthy tissues and the more fragile pathological tissues. Its use can thus only be contemplated against certain types of cancers. On the other hand, in the case of a very favourable radiosensitivity the site and extension of the tumour become of secondary importance, on condition that one uses a ray of short wave-length.

In the beginning of radiotherapy the first of these procedures was alone employed, both by the use of unfiltered x-rays and by the use of radium, utilizing its "total radiation". It was originally applied to superficial lesions. Then, encouraged by some results obtained in certain highly radiosensitive tumours, and better armed in the matter of instruments, therapists began to attack cancers more deeply situated. From this time on the techniques of roentgen- and curie-therapy began to diverge. X-rays could be produced in great quantity, but one obstacle hampered their efficacy—their insufficient penetration. Their use was gradually reserved for the treatment of extensive cancers of slight depth (those of cancer of the breast, for example), or deep but extremely radiosensitive lesions (such as lymphosarcomas). Concerning radium, the advantage of the extreme power of penetration possessed by its γ ray was strongly counterbalanced by the small quantity of the substance at one's disposal — several centigrams only in the case of the most fortunate therapist. It is true that one could introduce into the interior of the natural cavities, and even into the tissues themselves, these minute radiogenic ampoules, from which arose an ingenious adaptation of the material,

favoured by the use of radon, permitting the administration of the rays in cancer locations up to then untreatable—the nasal fossæ, mouth, œsophagus, pharynx, uterus, bladder, prostate, etc., but these attempts have not all given satisfactory results, because of inaccuracy in the placing of these small sources and the limitation of their field of action.

Summarizing, during this second period in the history of radiotherapy it was demanded that x-rays furnish large quantities of moderately penetrating rays. On its side, radium permitted the application of a very penetrating radiation, but which, because of its minimal intensity, could efficaciously exercise its action only over a limited territory.

For some time now there has been a reversal of this situation. The power of x-ray apparatus has increased greatly; irradiation with 200 kilovolts has become common; stations utilizing 300, 600, 700 kilovolts are in operation in certain countries. In several institutions in the United States installations have been made which assure a therapeutic service with a ray of a million volts, submitted to regular control. The difference between the quality of the x and γ rays is thus considerably reduced.

Curietherapy has, on its part, increased its possibilities, owing to the preparation of ever greater quantities of radium. At the present time there are institutions which utilize sources containing several grams of this metal, irradiating at a distance of several centimetres from the body, under conditions approaching those of an x-ray tube. However, at the Institut du Radium of Paris, for example, where, under the direction of Dr. Regaud, experimentation has been carried on for many years with an apparatus containing 8 g. of radium, neither x-ray nor the small apparatus of curietherapy has lost its indication.

THE REASONS FOR THE CHOICE OF RADIUM IN THE TREATMENT OF CERTAIN CANCERS

The exploratory work on the action of radiation in cancer may be considered as finished, at least provisionally, until the intervention of a new element of progress. All the principal types of neoplasms have been tested, and one can schematically divide them into three groups: (1) the radiosensitive cancers, that is to say, those often curable by radiation, which include, in a descending order, sarcomas of the hæmatopoietic system, germinal epitheliomas, lymphoepitheliomas, pilo-sebaceous epitheliomas, stratified epitheliomas of mucous membrane and cutaneous type; (2) cancers slightly radiosensitive, which one sometimes cures by radiation, comprising the adenocarcinomas of the breast, visceral adenocarcinomas, those of the mucosæ of cylindrical cells, and sarcomas of connective tissue; (3) the radioresistant cancers, which one cannot cure by a selective action of radiations, such as the rhabdomyosarcomas, nævocarcinomas, and many tumours of nervous origin.

Among the neoplasms appearing in the preceding list are those which one treats more usually with radium. What are the reasons for this preference? The anatomical site often determines the choice of the radiating agent. Two localizations wherein radium intervenes as the principal element in the cure of certain cancers are the buccal cavity and the uterus, including the cervix uteri.

The greater part of cancers of the mouth were incurable until the perfection of the technique of radium therapy permitted one to obtain a small, but notable, proportion of cures. This forward step was the result of the utilization of favourable conditions peculiar to the region. In fact, localizations such as the anterior portion of the tongue permit a correct implantation of radioactive needles; in others, such as the floor of the mouth or the hard palate, a small radiating apparatus can be applied without great difficulty; in other regions, finally, such as the buccal surface, one can produce a cross-fire at close distance very efficaciously. Neither penetrating roentgentherapy nor telecurietherapy from a source of several grams has been able to supplant these little radium applicators introduced into the mouth for the treatment of cancer in this cavity, with the exception of certain highly radiosensitive varieties, for example, those frequently met with in the region of the tonsils.

The tongue furnishes a particularly good example. Cancers arising in the anterior part of the dorsum of this organ are almost all epitheliomas of epidermal type, consequently, within the sphere of favourable radiosensitivity. One can cure an important proportion of these by the introduction of radioactive foci. However, radiation of the cervical adenopathies which frequently accompany these cancers still

remains ineffective. In the tongue, the brutal radiation from foci of low filtration, exercising an action at a short distance from the cancerous cells in the midst of which they are plunged, produces destruction of the cells, but the principal difficulty is to avoid necrosis of the healthy tissues. This technique is inapplicable against the lymphatic spread; since moreover, the insufficient radiosensitivity of the cancer does not allow one to rely upon a selective destruction of all the neoplastic cells, in a region scarcely favourable to radiation, one prefers to associate radium-puncture of the tongue with a surgical resection of the adenopathy.

Epitheliomas of the cervix uteri offer a subject for discussion which is equally interesting. It is less and less contested today that this cancer is outside the domain of surgery; with the exception of certain rare indications it should always be irradiated. Statistics demonstrate a high percentage of cures when the treatment is begun before the lesions are too extensive. But they demonstrate also the important part that radium plays in these cures. The results (which are beginning to be known) obtained by radiation utilizing an external source of penetrating rays only (x-rays of one million volts as well as γ) remain markedly inferior to those given by the combination of these same irradiations with an intra-cavitary utero-vaginal curietherapy. This local application still constitutes an essential factor in the cure of a great number of cases.

In other cancers roentgenotherapy is, at the moment, advantageous. Thus, it has advantages in the treatment of highly radiosensitive neoplasms, with a rapid and extensive course, capable of spreading far, for example, the lymphosarcomas, seminomas, and germinal epitheliomas of the ovary. One may hope to obtain a sterilization by means of x-ray apparatus permitting the use of very large fields and a long focal distance. These conditions are actually not realizable with telecurietherapy. It is also the case, but for other reasons, in regard to the epitheliomas of the pharynx and larynx the treatment by x-rays has been perfected to a degree which curietherapy, it seems, has not reached.

Finally, too many cancers, among the most frequent, do not respond in a satisfactory manner to radiation, notably, the epitheliomas of the digestive tract, those of the bladder and prostate, etc.

What may we hope to obtain from the use of sources of γ rays exceeding largely in power those in actual use, containing several tens of grams of radium, and acting at a distance of several tens of centimetres from the skin? Is telecurietherapy destined to replace roentgenotherapy under the indications wherein this latter still holds privilege? will it be for curietherapy to widen the field of efficacy of radiotherapy in those cancers remaining up to now refractory to this treatment?

THE FUTURE POSSIBILITIES FOR THE USE OF RADIUM

In attempting to foresee the place which radium will be called upon to take in the therapy of cancer one risks being classed as a light-witted soul, to say the least. Are we authorized to speak of the future of radiotherapy in this domain? Certainly, it is still in its rudimentary stage. But if radiation has undoubtedly transformed the therapy of cancer, one must however recognize that the hope which it has lent to many patients, for the treatment of whom one could propose nothing else, is too often misplaced, and also that, in a considerable proportion of cases when one attempts its use it is with the hope of a mental amelioration, knowing in advance that it cannot act upon the cells of a radioresistant neoplasm.

We may justly be permitted to imagine some adjunct or other, of a biological, physical or chemicotherapeutic nature, which would reverse the situation by enabling us to strike the neoplastic elements more effectively. Do not some already see in the neutrons a substitute for x-rays and radium? But one may imagine a discovery in an altogether different field which will lead to the cure of cancer by other methods than radiation, or by preventing its production, as a result of a better understanding of its causes. Let us agree, then, that if we put up the question of the future of curietherapy it is on the assumption that the situation with respect to cancer treatment rests as it is today.

One may thus consider as certain that at some future time one can have at his disposal for purposes of treatment sources of γ rays containing several tens of grams of radium. There is no

doubt but that the destructive effects on the neoplastic tissues actually now realizable by x-rays will be possible under as favourable conditions with such apparatus. From this point of view, and especially if the question of price is in favour of radium, one would be led to conclude that curietherapy would supplement all other agents in the radiotherapy of cancers. However, before closing the question, one must also weigh the argument of protection, in particular that of the personnel. In this respect x-rays have an enormous advantage over radium. The obligation to protect from the radiation throughout the duration of the treatment of the patient (necessarily long, if carefully done) the doctor and nurses who carry it out represents a problem already difficult in connection with the existing large foci of radium. It will become all the more difficult when the radioactive substance is multiplied ten times. The thick walls of lead, putting the source at a distance only temporarily, can never be so simple or so economical as the opening and closing at will of an x-ray switch. But, however intense may be these beams of very short wave-length rays (coming either from a radium or x-ray apparatus still more powerful than now exist) it would be illusionary to speculate on the extension of their efficacy to types of cancer different from those which we now know how to affect. One may be able to increase the proportion of cures among radiocurable neoplasms, but the constraint of the difference between the radiosensitivity of normal and pathological tissues, leading, in the case of resistant cancer, either to radionecrosis or recurrence, will persist unchanged if other conditions remain the same.

The solution of the above problem, the conditions of which we have fixed, seems thus to be as follows. From the therapeutic point of view, radium could completely replace x-rays in the radiotherapy of cancer; from the same point of view, x-rays could take a place exclusively in teleradiotherapy. Practically, even when we take into consideration, the services which the new apparatus of roentgentherapy at a short distance (contact-therapy) may render, the small curietherapy foci in the form of tubes, moulage, needles, etc. made for superficial intracavitary or interstitial applications, seem destined to endure as long as the radiotherapy of cancer itself. They will persist moreover as an indispensable arsenal because of a varied action, at the same time very powerful and very localized, which they alone can exercise.

PATHOLOGICAL AND IMMUNOLOGICAL STUDIES IN POLIOMYELITIS*

BY MAURICE BRODIE, M.Sc., M.D.

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A CONSIDERABLE amount of work has been carried out in the past few years in poliomyelitis towards the elucidation of the portal of entry and route of transmission of the virus, and upon the significance of the so-called antibody or neutralizing substance. These studies have increased our understanding of the disease, and thrown open to doubt previous concepts of treatment and prevention.

In order to clarify and evaluate the experimental data herewith described I wish to make a few remarks about experimental poliomyelitis. The disease agent, a filterable virus, cannot grow upon non-living media as do bacteria. It has a narrow range of host susceptibility, the central nervous system of man and certain monkeys, where it multiplies and produces lesions. The experimental animal of choice is the *Macacus rhesus* monkey. The spread or multiplication of the virus can be demonstrated by inoculation into the monkey, whereupon the animal develops fever, cerebrospinal fluid pleocytosis, and flaccid paralysis. The histo-pathological picture of the brain stem and spinal cord show neuronophagia, with perivascular and interstitial infiltration. The spinal cord of such an animal can, upon suitable inoculation, produce the disease in another animal.

The neutralizing substance, or so-called antibody, is present in the blood serum of certain normal persons, especially adults, and also in

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the serum of some convalescent human beings and monkeys. A serum which contains neutralizing substance renders virus non-infective, so that the incubated mixture fails to infect monkeys. The virus used in this and many other laboratories has been passed through monkeys for many years, and so is highly virulent for these animals. From time to time new strains obtained from spinal cords or nasal secretions are transferred to monkeys. It is from the blood or tissues other than the central nervous system.[1] In our own laboratory we tested the blood of intranasally infected monkeys in the incubation period of the disease, in the pre-paralytic, and late stages of the disease, and were unable to demonstrate virus.[2] Moreover, animals sacrificed in the pre-paralytic stage of the disease failed to show the presence of virus in the liver, spleen, lymph glands, kidneys, salivary glands or muscles.[2] Also,

TABLE I.

Monkey number	*Clinical course*	*Intracerebral*	*Reinoculation*	*Neutral*	*Tests*
		Time after onset	*Result*	*Time after onset*	*Result*
J 207	Arms and legs weak; later legs paralyzed; residual paralysis.	3 weeks	Resistant	2 weeks	— –*
				8 "	– –
J 64	Legs paralyzed; arms weak; residual paralysis in all limbs.	6 "	"	6 "	— –
R 62	Legs paralyzed; arms weak; residual in legs.	6 "	"	6 "	+**
J 230	Weakness in arms; ataxia; complete recovery.	8 "	"	3 months	+
69	Right leg paralyzed; other limbs weak; residual paralysis in legs.	6 months	"	7 "	–
V 8	Left leg paralyzed; other limbs weak; residual, all limbs.	7 "	"	8 "	+
B 79	Arms paralyzed; one leg paralyzed; residual, one leg.	10 "	"	7 "	–
T 6	Left arm paralyzed; legs weak, complete recovery.	8 "	"	9 "	–

*Serum failed to neutralize.
**Serum neutralized.

essential to know whether such strains are related to, or differ immunologically from, the standard virus. This is done by testing with the new strains sera known to have neutralizing bodies for the passage virus and animals that have recovered from it. Likewise, animals recovered from the new virus and their sera are tested against the passage strain.

THE PATHOGENESIS OF THE DISEASE IN THE MACACUS RHESUS MONKEY

The essential lesions of experimental poliomyelitis occur in the cord and brain-stem, and they closely resemble the human findings. There has been considerable controversy regarding the route of transmission, and the pathogenesis has only been established in the past few years. Despite the systemic symptoms which may occur prior to the central nervous system symptoms one can readily rule out a primary hæmatogenous or lymphogenous spread. The virus has rarely been isolated in keeping with the findings of others, we failed to show significant lesions outside the central nervous system in more than 50 monkeys killed in the acute stage of the disease.

The transmission of the virus through the central nervous system is not by way of the spinal fluid, for it is rarely found there. We were unable to demonstrate the presence of the virus in spinal fluid removed in the incubation period in the pre-paralytic or paralytic stages of intranasally infected monkeys.[2] The work of several investigators has indicated that the cellular exudate in the cerebrospinal fluid is the result of an overflow from the nervous tissue by way of the perivascular spaces. In keeping with this is the fact that symptoms may occur in the animal prior to the pleocytosis, or may even be absent throughout the course of the disease.[3]

The idea of transmission by nerve tracts, first suggested by Liener and Wiesner and Römer, has received considerable support from Hurst

and co-workers in England and Faber and ourselves in this country. Fairbrother and Hurst[4] traced the virus from such sites of inoculation as the brain and sciatic nerve by following the sequence of the histo-pathological changes and distribution of the virus at various stages of the disease, and concluded that it travelled by way of the nerve tracts. After intra-nasal instillation of virus, lesions and virus are first found in the olfactory bulbs,[5] and follow in a general way the olfactory apparatus.[4] We,[6] as well as Schultze and Gebhardt, have been able to prevent infection *via* the nasal route by sectioning the olfactory nerves. Likewise, we were unable to infect by inoculating below the line of cleavage of a sciatic nerve whose peri-neural sheath had been sutured. In keeping with these findings Jungeblut and Spring reported that after intra-cerebral inoculation into an animal with severed spinal cord the virus failed to reach the lower segment. We have found that in animals with cut spinal cords, and in which a free flow of cerebrospinal fluid was demonstrated, the virus failed to pass the gap when inoculated into either the upper or lower segment. Similar findings were obtained with both passage virus and two recently isolated strains. These experiments also help to rule out either hæmatogenous or lymphogenous spread of the virus, for the blood supply was intact to both upper and lower segments of the cerebrospinal axis.

If the virus travels along the nerve tracts one would expect its primary effects upon the neurones. This is borne out by histo-pathological studies and by the fact that the amount of nerve cell destruction in the various areas of the cerebrospinal axis is correlated with the quantity of virus present. It appears, therefore, that in experimental poliomyelitis injury and death of nerve cells is the outstanding lesion, and that the exudate is merely secondary.

One cannot always interpret the human disease in the light of the results obtained in experimental animals. In yellow fever, for example, the virus produces a generalized disease in human beings and in monkeys, while in the mouse the disease is decidedly neurotropic. The manifestations of some other viruses also vary with the host.

The portal of entry in the human has been and still is the subject of considerable controversy. In the experimental animal the virus has definite predisposition for the olfactory nerve, but we shall consider only those studies which deal directly with the human subject.

Evidence to favour the nasopharynx as the portal of entry is as follows. (1) The epidemiology of the disease resembles in many respects a droplet disease. (2) The onset of the disease is often accompanied by upper respiratory symptoms. (3) The virus has been isolated from the mucosa and naso-pharyngeal washings of acute cases, from the nasal excretions of normal and convalescent carriers, abortive and non-paralyzed cases. (4) Rarely has the virus been isolated from the gastro-intestinal contents or its mucosa. The gastro-intestinal tract as a portal of entry has received considerable attention recently by Kling and his co-workers in Europe and Toomey in this country. They have pointed out certain epidemiological aspects of the disease whereby it resembles a gastro-intestinal infection, and have also stressed the gastro-intestinal symptoms that often accompany the onset. Harmon[7] reported recently that he was unable to find the virus of poliomyelitis in the nasopharangeal washings of 20 cases, yet he claimed to have been able to demonstrate its presence in the fæces of 5 of them. He also failed to demonstrate lesions in the olfactory bulbs of 9 fatal cases. The details of these rather significant experiments have not as yet been published. Landon and Smith[8] recorded lesions of the olfactory bulbs in only 25 per cent of a series of 56 cases which they examined. These conflicting data on the epidemiology and on the isolation of virus from the human body should make one consider the possibility of both portals of entry, especially as some epidemics start with nasal and others with gastro-intestinal symptoms. It is true that the evidence greatly favours the naso-pharynx as the portal of entry.

Direct evidence upon the route of transmission, based upon studies in the human subject, is rather meagre. The idea of a general dissemination, either lymphogenous or hæmatogenous, is based on the systemic manifestations of the disease frequently present prior to central nervous system symptoms. Medin stressed the pre-paralytic symptoms and described the so-called "dromedary" or diphasic type of the disease. Many pathologists have stressed the

histo-pathological lesions found outside of the central nervous system. Rissler being one of the first and recently Smith[8] has stressed their importance.

On the other hand there are those who believe that the generalized symptoms can be explained entirely upon a central origin. The virus in travelling through the central nervous system can strike the temperature and vasomotor centres in the hypothalamus, causing fever, gastro-intestinal or upper respiratory symptoms, and other symptoms evident in early poliomyelitis. If in monkeys, where the disease is entirely neurotropic, one can have a systemic phase of the disease and even diphasic attacks,[3] the same should be possible in the human being.

Likewise, some believe that the lesions outside of the central nervous system are inconsequential, like those of any acute infectious disease. They may not indicate a proliferation of the virus in these organs. Our own studies of 7 cases were in accord with this belief, for we found but slight changes in the spleen, lymph glands and thymus.

Attempts to obtain the virus from the blood stream have been negative. Likewise, the virus has been isolated in organs other than the central nervous system but once,[1] although the number of attempts have been relatively few. In our laboratory different tissues, including the liver, spleen, kidney, lungs, submaxillary glands, mesenteric lymph nodes and muscle from three cases were tested for the presence of virus. Large quantities of these tissues failed to produce poliomyelitis in monkeys, although infections were obtained with relatively small amounts of cord tissue from these cases.

It is hardly likely that the virus is carried by the cerebrospinal fluid, for our own attempts and those of others have failed to reveal the presence of virus in it. Moreover, the pleocytosis may occur after the onset of nervous symptoms, or be absent, suggesting that the cells enter the subarachnoid space from the cord. The increase in protein sometimes occurs after the pleocytosis; this would be hardly likely if the meninges were involved earlier than the cord. Therefore, axonal transmission and primary involvement of the neurones, the latter suggested by Charcot and Joffrey 65 years ago, must be considered, but this view is in need of further proof.

THE PRESENCE OF NEUTRALIZING BODIES AND RESISTANCE TO THE DISEASE ARE NOT NECESSARILY CORRELATED

Immunological studies.—When the virus of poliomyelitis is inoculated into a susceptible host two changes can occur. One is a resistance against reinfection, the other, the development of the so-called neutralizing substance. It was thought until recently that these were associated. As has been recently pointed out by Schultz and Gebhardt and Olitsky and Cox,[9] we have found that animals inoculated by the skin route with active or modified virus may develop neutralizing substances and yet fail to resist intra-cerebral inoculation of the virus. Likewise, Jungleblut[10] and Sabin and Olitsky[11] have shown that recovered monkeys may resist reinfection at the time when they possess no serum neutralizing substances. Upon extending these studies, it was found that the serum of only 3 out of 8 convalescent monkeys which were resistant to reinoculation neutralized the virus although tested as long as 8 to 9 months after the onset of the disease (Table I). Likewise a number of investigators have shown that the sera of convalescent patients may fail to neutralize the virus. Recently we carried out an extensive study upon convalescent sera obtained from children admitted to the Willard Parker Hospital during the New York City outbreak in 1935.[12] The sera of a large group of children, both paralytics and non-paralytics, were tested upon admission, that is, within a few days of the onset of the disease. A number of those who failed to neutralize the virus were retested at short intervals up to 8 or 9 months after the onset. The composite results, given in Table II, indicate that the majority of these children

TABLE II.

Summary of neutralization tests during first year of convalescence of persons whose sera failed to neutralize in the first week.

	Paralytic		*Non-paralytic*	
Age groups years	*Number tested*	*Number neutralized*	*Number tested*	*Number neutralized*
1-5.....	16	1	2	0
6-10.....	14	0	6	0
11-17.....	6	1	3	0
Adult.....	3	0	0	0
Total...	39	2	11	0

failed to develop neutralizing substances in their sera. Moreover, 14 out of 82 paralytics had neutralizing substances in the first few days of illness and 2 of these in the pre-paralytic stage. Harmon and Harkins also reported the presence of antibody in the serum of a patient tested in the pre-paralytic stage. One might say that these 14 individuals responded to the virus with antibody formation, very quickly. I wish to remind you, on the other hand, that of 39 who lacked antibody upon admission but 2 developed it within some months after the onset. This leads me to believe that poliomyelitis can develop in the presence of neutralizing substances.

Antibody is probably an indication of immunity.—From these data one may well inquire as to whether the presence of neutralizing substance is any indication of immunity or resistance to infection. Up to the present time there is no such evidence in the experimental animal. This may be due to the fact that the level of neutralizing substance is not sufficiently high, or else, because the virus is neutrotropic and antibody cannot reach it. In the case of human beings there is evidence to believe that neutralizing substances correspond to some extent with immunity. The incidence of the presence of neutralizing substance is at the onset of the disease decidedly higher in non-paralytics than in paralytics (Table III). There is even more evidence in the case of persons over the age of ten, of whom more than 50 per cent show neutralizing substances, very much like the so-called normals (Table III). This decidedly smaller proportion of paralytics, especially over the age of ten, who possess antibody as compared to non-paralytics or normals suggests that the neutralizing substances help to limit or prevent infection.

The specificity of the neutralizing substances.—Do the above inconsistencies between the presence of neutralizing substances and resistance disprove the idea that the former is a specific response to the virus? In other words, does the resistance arise only from exposure to the virus or can it result from other factors as developmental changes such as Jungleblut and Engle have suggested? It might even result from exposure or reaction to a related antigen. There are certain factors in the epidemiology of the disease on account of which it is difficult to explain the presence of neutralizing substances in adults on the basis of subclinical immunization.[1] Moreover the antibody is present in the sera of individuals who reside where poliomyelitis is almost absent.[1] On the other hand, the distribution of the neutralizing substances in the sera of both urban and rural residents follows the trend of the Schick test, and in diphtheria this immunity is well founded upon exposure.[1] It is absent from the sera of monkeys where the likelihood of exposure to the virus is remote. We have been unable to demonstrate neutralizing substance in the sera of monkeys of different ages, nor were they resistant to inoculation. Moreover, the failure to develop neutralizing substance in convalescents does not detract from the idea of the specificity of the antibody. One can scarcely assign the inability of these affected with poliomyelitis to a general constitutional defect in view of the fact that so many monkeys may fail to show its presence in convalescence. Likewise, it does not seem to be an inhibition of antibody formation for neurotropic viruses. To this end the sera of ten convalescents, some known to have poliomyelitis antibody and some that lacked it were tested against a neurotropic herpes virus. There

TABLE III.

Summary of neutralization tests with sera taken in the first week of the disease and from normals.

	Paralytics			*Non-paralytics*			*Normals*		
Age group in years	*Number tested*	*Sera neutralized*	*Sera failed to neutralize*	*Number tested*	*Sera neutralized*	*Sera failed to neutralize*	*Number tested*	*Sera neutralized*	*Sera failed to neutralize*
1-5.....	26	2	24	6	1	5	96	5	91
6-10.....	25	4	21	14	10	4	38	11	27
11-17.....	19	4	15	10	5	5	25	19	6
Adults....	12	4	8	2	2	0	13	7	6
Totals..	82	14	68	32	18	14	172	42	130

was no correlation, and convalescents who failed to develop poliomyelitis-neutralizing substances showed herpes antibodies. In other virus diseases antibody may be absent in convalescence, and so its absence in poliomyelitis convalescents should not appear unusual. Its presence or absence may depend upon the amount of virus that leaves the central nervous system to reach the antibody depots. The occasional development of antibody more than a year after the onset may be the result of hyperimmunization.[12] A very strong argument in favour of the specificity of the antibody is the fact that it has been produced experimentally only after exposure to the virus.

THE TREATMENT OF POLIOMYELITIS

Prior to 1931 serum was generally recommended in the treatment of pre-paralytic poliomyelitis, despite the lack of statistically controlled data to prove its worth. As a result of two separate controlled studies carried out during 1931 in which alternate cases without paralysis were treated with serum, the mortality and paralysis rates were approximately the same for the treated and untreated cases. In the experimental animal, where the disease is entirely neurotropic so that the virus contained in the central nervous system is walled off from the blood system by the Virchow-Robin spaces, extremely large doses of tested serum of high neutralizing power failed to affect the course of the disease. Serum or whole blood in 75 to 300 c.c. amounts was given intravenously at the onset of symptoms, and in one instance during the incubation period.

Should human poliomyelitis prove to be a systemic disease with secondary localization in the central nervous system can better results be obtained with larger amounts of more potent serum? This question may well be asked, since untested convalescent serum was used in the 1931 outbreak, and so many of the specimens making up the pools of sera probably lacked neutralizing antibodies. However, the diagnosis of poliomyelities cannot be made until meningeal manifestations are apparent and then the central nervous system is already involved. At best the serum could only prevent more virus from entering the central nervous system. Little of it can pierce the blood central nervous system barrier, any more than can salvarsan. Any that pierced the barrier, broken down through inflammation, would be ineffective in preventing further spread of the virus, for a virus that is already fixed to cells can grow in the presence of its own antibody.

Various non-specific treatments have been advocated and tried. Amongst these are repeated lumbar puncture or spinal drainage. It seems hardly likely that the increased flow of spinal fluid can wash out the virus that is already fixed to the nerve cells. Adrenalin, ephedrine and hypertonic solutions have been used to relieve the œdema and congestion of the central nervous system, but without definite results. These measures may be of value in bulbar cases, to relieve temporarily pressure upon the vital centres.

PREVENTION

Active immunization.—Because of the belief prevalent until recently that neutralizing substances were indicative of immunity to poliomyelitis a considerable amount of the active immunity work in monkeys was gauged by the antibody response. Neutralizing substances have been produced in monkeys by skin-inoculation of active virus,[1] attenuated,[1] or germicidally treated, non-infective virus.[11, 15] I have also reported[15] that some animals which had received formalized virus were also resistant to intracerebral inoculation of virus. Other workers have failed to confirm this finding. Whereas I used for the test dose what approximated a minimal infective dose of virus, these experimenters injected a stronger dose. The reliability of such small doses has been questioned.[16] Further investigation upon this subject leads me to believe that it is unwise to use such small doses of virus to test animals.

Both the ricinoleated virus used by Kolmer[17] and the formolized virus used by ourselves produced neutralizing substances in children. Children whose serum failed to neutralize in the control period appeared to respond better than did monkeys. Aycock and Hudson[18] and Kramer found that children in an epidemic area developed antibody within several months. The former tested sera from a group of children from an epidemic focus during the 1935 North Carolina outbreak who had received formalized vaccine, and compared the findings with those in a group of non-vaccinated chil-

dren. The tests carried out just before vaccination and sera were again obtained approximately 2 months after the first dose of vaccine. Of those whose serum failed to neutralize in the first test, 10 of 19 vaccinated and 9 of 31 controls had developed neutralizing bodies.

The children whom we tested were in an area free of known cases of poliomyelitis, and the tests were carried out within three to four weeks after the administration of the vaccine. It seems likely, therefore, that the antibody response was due to the vaccine. Altogether, 10,000 children received formolized virus, but the number was too small to give information as to the value of the vaccine from a comparison of the incidence of the disease in the vaccinated individuals and the controls. A report by the Kern County Health authorities,[19] who vaccinated nearly 4,000 persons in an epidemic area, concluded as follows: "Although the results are not statistically conclusive, they strongly suggest an actual immunizing effect from the Brodie vaccine."

The probability of obtaining an effective vaccine will depend upon several factors. In the first place should the human disease prove to be neurotropic, as in the monkey, it will be difficult and perhaps impossible to develop a safe and effective vaccine. If, on the other hand, the human disease proves to be systemic, then by analogy with other diseases a non-infective vaccine may produce immunity.

The measure of a person's reaction to the vaccine will be the presence of neutralizing substances. It will be necessary therefore to carry out further work with a view of determining the relationship of the presence of antibody to resistance to the disease. It will also be necessary to determine whether or not susceptible persons are capable of producing neutralizing substances. The need for a susceptibility test is quite obvious.

The practical application of a vaccine will be in a large measure determined by whether single or multiple strains exist. If multiple strains that are unrelated immunologically exist, it will be hardly feasible to prepare a polyvalent vaccine. Until recently the evidence has been that differences in strains were quantitative, that is the results of differences in virulence. Recently, several investigators have reported that qualitative changes exist. In our studies upon three strains we found that one was almost identical with the passage strain and that the other two differed qualitatively. One must bear in mind the possibility of only one strain existing in the human being but that virus specimens can be modified in passage through the monkey. There is evidence of this in other virus diseases. The few secondary cases of poliomyelitis that have been reported speak against multiple strains.

Nasal sprays as a method of prevention.—Tannic acid, alum, zinc sulphate[20] and other astringents applied to the nasal mucosa protect monkeys against the intranasal instillation of virus. Although the exact mechanism by which these substances can protect monkeys from intranasal infection is not definitely known it is believed that they protect the olfactory nerves from the virus. The method was applied to human beings in the summer of 1936 in Alabama by Armstrong of the United States Public Health Service,[21] but the results were not encouraging. Armstrong felt that the failure was attributable in part to improper application of the spray.

On the other hand there are other reasons which speak against the probable success of nasal sprays as a means of prevention in children, although they protect monkeys against nasal infection. In the first place, due to frequent blowing and picking of the nose and other forms of trauma to the mucosa of children, the applications may not last sufficiently long to serve as a successful barrier. In addition the irritation produced may weaken the olfactory barrier if the virus travels along the olfactory nerve. Secondly, the spray can be administered to young children only with difficulty and not always satisfactorily. Even more important is the possibility that the virus does not travel along the olfactory nerves. It would seem more logical therefore, to elucidate the path of the virus and let the future use of nasal sprays be guided by the results.

CONCLUSIONS

1. The virus of poliomyelitis in the experimental animal is strictly neurotropic and travels by way of the nerve tracts.

2. Neither the route of transmission nor the pathogenesis has been finally determined in the human subject. Therefore one cannot draw too close an analogy between the experimental and human diseases, nor apply all experimental results that bear upon the route of transmission and pathogenesis to the human being.

3. The immunological data were studied, from which the following conclusions can be stated: (*a*) The presence of serum-neutralizing substances or the so-called antibodies, and resistance to the disease are not necessarily correlated. However, in the human subject there is evidence to believe that the presence of antibody may be indicative of immunity. (*b*) Recovery from poliomyelitis does not as a rule, result in demonstrable antibodies or neutralizing substances. (*c*) The so-called neutralizing substance can develop only as a result of specific exposure to the virus. (*d*) There is evidence to believe that more than one strain of virus exists.

4. Neither convalescent serum nor any of the other available measures of treatment that have been advocated offer any hope for the prevention or limitation of paralysis in treated case.

5. The value of active immunity as a preventive is undetermined. Further studies should be withheld until the human pathogenesis has been worked out, and further immunology, especially upon the question of strains.

6. Nasal sprays are effective in protecting the monkey. In the human being the results are not encouraging, and the reasons are discussed for believing that they will not protect.

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PRE-ECLAMPSIA*

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PRE-ECLAMPSIA is the name applied to a group of signs and symptoms which we usually believe to have been brought about by the presence of a toxin within the mother. It has been termed pre-eclampsia because the clinical and laboratory features are so closely allied to eclampsia. The common belief is that pre-eclampsia is frequently the forerunner of eclampsia, or that eclampsia is often the result of an untreated pre-eclampsia. It seems that we must be content at present to accept this seemingly intimate relationship between pre-eclampsia and eclampsia until we have proved it otherwise. We could of course designate all such toxæmias as eclampsia, and then divide eclampsia into the mild, moderate and severe forms. However the term pre-eclampsia serves the same purpose, and it is a term which has been in such common use for so long that we are loath to discard it until we have a good reason for doing so. Pre-eclampsia is synony-

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mous with the term *eclampsisme*, used by certain European writers.

The etiology of pre-eclampsia is still unknown. I believe that most of the clinical manifestations of the disease are end-results; seemingly, none of these have acted as causative agents. The gain in body weight, the rise in systolic blood pressure, the renal changes, and the changes in liver function are apparently products of a cause, but the pathological changes found in various organs of the body have not yet led us to that cause.

Some of the factors which have been receiving serious consideration within a recent date may be briefly reviewed. There are three possible sources, the baby, the mother and the placenta. We have no specific evidence that the cause is to be found in the baby. We know that a grave form of toxæmia may be found in association with a vesicular mole, in which there is no fetus. Chemical observation of the maternal blood and urine goes to show that there is no accumulation of waste products. A certain amount of evidence has accumulated which goes to show that the toxæmia arises within the mother. Certain of these theories might now be reviewed.

Cary[1] claims that on a free protein diet a putrefactive type of bacteria is developed, which is capable of splitting the mucus found in the large intestine into a toxic substance. This toxic substance acts as the cause of pre-eclampsia. Hofbauer[2] in 1918 held that there was an excess of the pituitary diuretic substance in the mother's blood during pregnancy, and that this was the cause of eclampsia or pre-eclampsia. C. Wilson and F. B. Byron[3] in 1934, after quite extensive work, concluded that there was not an excess of the pituitary diuretic substance in the blood of pre-eclamptic patients. Paramore[4] believes that pre-eclampsia and eclampsia result from the increased intra-abdominal pressure as the uterus enlarges during pregnancy. The mechanical pressure of the uterus interferes with the normal capillary circulation in the liver, and finally interferes with normal liver function. Several students of the subject believe that pre-eclampsia is the result of a disturbance in protein metabolism. They maintain that certain end-products of protein metabolism fail to be completely broken down, resulting in an accumulation of rest nitrogen guanidine or a similar substance, which is believed to be the cause. A disturbance in the endocrine balance in the body is said by some to be the cause. Hofbauer[5] believed that pituitary dysfunction was the cause. Shute,[6] in our School, believes that an excess of œstrin or œstrogenic substances within the mother may be the cause of pre-eclampsia or eclampsia, by bringing about placental detachment along with moderate degrees of hæmorrhage. Hypercholesterolæmia is believed by Bartholomew and Kracke[7] to be the cause of this form of toxæmia. They state that the normal blood cholesterol is raised from 125 mg. per cent in the non-pregnant woman to 200 mg. per cent during pregnancy. This excess of cholesterol tends to be deposited in the intima of the smaller blood vessels. In time the lumen of the vessels is more or less occluded, leading to areas of infarction. The toxic substance is then derived from the impacted areas.

Considerable evidence has at the same time accumulated in favour of the toxin arising from the placenta. Prof. James Young,[8] of the Post-graduate School, London, claims that a placental cotyledon becomes separated from the uterine wall owing to hæmorrhage or some other interference with the maternal blood supply. Massive necrosis of the separated cotyledon follows. He found red infarcts in the eclamptic placenta. Such a mass of necrotic tissue may become the source of toxic autolytic bodies capable of producing eclampsia or other pregnancy toxæmias. Schmorl[9] believes that portions of chorionic villi break off into the mother's blood stream. The autolysis of this epithelial tissue produces certain toxins which cause pre-eclampsia and eclampsia.

Dryfus[10] thinks that the activity of the intracellular ferments of the placenta are increased in eclampsia, and he also claims that autolysis takes place in the placenta before it is shed, in which case toxic products of protein autolysis are produced and act as the cause of pre-eclampsia.

Thus we may conclude that there is no common ground upon which the workers all meet. There are however in some of them certain relationships. One such relationship is the finding of Professor Young who claims that the origin is from an infarcted area in the placenta. He does not offer us a reason for the infarction.

Shute in our school, claims that the infarction is due to an excess of œstrin within the mother. Or again the impaction may be due to a hypercholesterolæmia, as claimed by Bartholomew and Kracke.

The laboratory findings of pre-eclampsia vary somewhat, but certain of the more consistent ones may here be cited. According to Sullivan, Tew and Watson[11] the liver function test is the most sensitive. The rate of the disappearance from the blood of the bile pigment is an index of the functional capacity of the liver. Berkeley, Dodds and Walker[12] believe that the liver function is the best guide in the prognosis of toxæmia and for the termination of the pregnancy. They also feel that too much reliance must not be placed on liver function tests. Cross[13] states that all liver function tests should be interpreted with caution.

Pregnancy may at times bring to light hitherto unsuspected renal damage.

Starling and Verney[14] believe it is possible that the sodium chloride and water secretion by the kidney is controlled by an anti-diuretic pituitary hormone. Where this comes from we do not know. The kidney tests which are of value in the toxæmias of pregnancy are the urea-concentration test, and the specific gravity volume test. These tests reveal with some degree of accuracy the ability of the kidney to function within normal limits or otherwise. Such tests are of assistance in giving a prognosis. They are tests of end-results of a disease and not tests for causative agents.

Blood chemistry.—Much work has been done on the chemical investigation of the blood and urine in pre-eclampsia. So far it has failed to throw light upon the nature of the toxæmia. Recent work has proved that a high ammonia co-efficient and other alterations in the nitrogen partition of the urine are not of special significance. Mild alterations are normal in pregnancy, while the extreme changes are due to other factors incidental to the toxæmia. It seems therefore that, as far as one can see at present, there are no changes in the blood chemistry which are characteristic of pre-eclampsia or eclampsia.

Pathological anatomy.—Accurate information concerning the pathological anatomy of the various organs affected is rather meagre. This is of course due to the fact that most cases of pre-eclampsia get better when treated early. The pathological findings which we are fairly clear about are those of actual eclampsia. Since, however, pre-eclampsia is believed to be a forerunner of eclampsia one could assume that the difference in the pathological changes in the two would be chiefly in degree. The pathological findings in eclampsia are not consistent, but the common findings are general œdema with hæmorrhage. The organs involved are usually the liver, kidneys, brain and heart. The findings suggest the presence of a toxin or something which produces similar pathological changes.

CLINICAL FEATURES

The clinical features of pre-eclampsia are well known to us all. Some workers claim that pre-eclampsia is uncommon and only constitutes from 5 to 8 per cent of all toxæmia patients. Others claim they make up over 25 per cent. The difference of opinion is due to a difference in diagnosis. Some of the pre-eclampsias may be classed under low-reserve kidney and hypertension or vice versa. My own view is that pre-eclampsia is the most common of all the toxæmias of late pregnancy. I have not found low-reserve kidney or hypertension to be nearly so common.

Pre-eclampsia is more common in primiparous patients, and usually develops during the last third of pregnancy. The systolic blood pressure is usually higher than in low-reserve kidney, but lower than in cases of hypertension. The diastolic reading is proportionally high. The albumin is greater than in low-reserve kidney and is usually greater than in cases of hypertension. Visual disturbances are fairly common. The ophthalmoscope may or may not reveal small hæmorrhages in the retina in pre-eclampsia, while in hypertension cases one usually finds evidence of old retinal hæmorrhages. There is a feeling of lassitude in pre-eclampsia of recent onset. There is not commonly any history of previous kidney trouble in pre-eclampsia, while in low-reserve kidney and hypertension one may get such a history. The urine of the pre-eclamptic may also contain casts.

An abnormal gain in body weight is one of the early signs of pre-eclampsia. According to Harding and Van Wyck[15] a gain of between

5 and 8 pounds is evidence of pre-eclampsia, or at least of water retention. I find this is one of the most reliable signs of pre-eclampsia.

An elevation in the systolic blood pressure is a fairly constant warning of pre-eclampsia. I usually consider this if the rise is over 130. According to Brown the systolic blood pressure is a more reliable guide than the diastolic. I agree. If the blood pressure is up to 140 systolic the patient should be started on pre-eclamptic management.

Œdema, either visible or occult, is another early sign. There is usually some œdema of the extremities. At the same time there is quite likely some œdema of the viscera, if one could demonstrate its presence. We do have reasonably good evidence of visceral œdema in many of the cases, however, such as headache resulting from cerebral œdema, and persistent moisture in the lung bases. All of these facts of course signify that the patient is becoming waterlogged.

The signs and symptoms of pre-eclampsia in order of their clinical significance are: (1) an abnormal gain in body weight (5 to 8 lbs. a month); (2) elevation of the systolic blood pressure over 135 for the average patient; (3) œdema, either visible or occult; (4) urinary changes, such as albumin in the urine, diminished output, possibly casts; (5) lassitude and headache.

TREATMENT

The management of the pre-eclamptic patient is somewhat as follows. She should preferably be at rest in bed until the condition is under control. Rest plays an important part in the treatment; I think it is the most important single factor. The next point is the diet. This should be salt-free until under control, and then I allow a little salt in the cooking, gradually working up the patient's tolerance. The question of protein is guided by the degree of kidney damage. If albumin is present with casts I would make the diet protein-free for a few days and then add protein, beginning with 50 g. a day and gradually increasing up to 75 or 100 g. as the patient improves. Allow her up to 450 to 500 g. of carbohydrate a day and 50 g. of fat. Give an alkaline mixture and Epsom salts as well. As she improves you may allow her up, but curtail her activities and insist on daily rest. Such a patient must of course be kept under fairly close observation from then on. Most of them can be guided along reasonably close to term and to full term. A certain percentage will require induction of labour a little before full term. These are the patients who are still somewhat toxic, and cannot be satisfactorily controlled, even with good management. I feel that with the very questionable toxic patient it is far better to do a medical induction a week or two before full term than to run the risk of losing the baby and at the same time endanger the mother's chances.

Prognosis.—The immediate outlook for the pre-eclamptic is quite good, providing she is treated early and properly. The ultimate outlook should be quite good. Such a mother may have several other pregnancies without showing a sign of pre-eclamptic toxæmia.

SUMMARY

1. A general review of the subject of pre-eclampsia has been attempted.

2. Pre-eclampsia is the term used to signify a pathological condition in the mother closely akin to eclampsia. There is no reason for dropping the term pre-eclampsia until we have a much better one. This will probably not come until we really know the etiology of pre-eclampsia and eclampsia.

3. There are evidently no constant or consistent findings in pre-eclampsia, except visceral œdema, small areas of hæmorrhage, and occasional areas of necrosis.

4. There are no characteristic changes in the blood chemistry of the pre-eclamptic patient.

5. The pathological results appear usually in the final third of pregnancy, during the period when the placenta is undergoing senile changes. Is there any relationship?

6. The exact cause of pre-eclampsia is unknown. Recent work directs our attention particularly to the placenta or some relationship between the placenta and the endocrines as the source of the trouble. The fact that the placenta begins to be senile in the seventh month may bring about a disturbance between certain body hormones and the placenta. In other words, the senile placenta may disturb the normal balance of the pregnancy hormone which was

maintained properly so long as the placenta was a youthful adult organ.

7. The clinical manifestations and management of pre-eclampsia have been outlined in the order of their importance.

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GERMAN MEASLES OR RUBELLA*

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GERMAN measles is a mild, insignificant disease, but when it occurs in a widespread epidemic it causes serious inconvenience and disruption of various social activities in a community.

In the winter of 1935-36 the greater part of Quebec and Ontario was visited by such an outbreak of German measles as was almost unprecedented. The epidemic occurred the previous spring in New York and other parts of the New England States, and spread northward. In Canada the outbreak apparently centred in Montreal, where it caused what was probably the second most widespread epidemic in the history of the city, the only more extensive one being the epidemic of influenza in 1918. How many persons in Montreal were affected it is impossible to say, as the disease was so mild that most of the cases were never seen by a doctor and were not recorded. The City Health Authorities admitted 15,000 cases recorded, but the total number must have been in the vicinity of 100,000. All parts of the city were affected and all classes of people. As might be expected, the schools, colleges and hospitals suffered most. Many schools reported 40 per cent of scholars and teachers affected. McGill University estimated that 20 per cent of the students were affected. The hospital work was seriously handicapped; *e.g.*, in the Children's Memorial Hospital 33 per cent of the nurses had the disease. This widespread outbreak gave unusual opportunities for observing the disease, and the following remarks may be of interest.

Second attacks of the disease are very rare, hence the usual occurrence of a general outbreak in a community is only about once in a generation. It is nearly twenty years since we had a marked epidemic of German measles in Montreal. Children were chiefly affected, but the disease was quite common in young adults, and occasional typical cases occurred even in elderly people.

When the incubation could be traced, it appeared to be always between 2 and 3 weeks, in the vast majority of cases just 17 days. This long incubation probably accounted for the long duration of the outbreak, which began in November, 1935, culminated in March, 1936, and only ended in May, 1936, about six months in all, as contrasted with influenza outbreaks which usually last 6 to 8 weeks only.

As to the infection, it is generally agreed that the disease is due to a filterable virus, and its mode of infection is very similar to that of measles and chicken-pox. The infection was almost exclusively by direct contact with patients, the many mild unrecognized cases ruining any efforts at control by quarantine. It is apparently difficult to convey it through a third person, and the condition of true chronic carriers

* Read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Ottawa, Section of Pædiatrics, June 23, 1937.

appears to be unknown. The disease is apparently most infectious in the pre-eruptive stage and there is no evidence of infection after the eruption fades and the swelling of the glands subsides. This point should be emphasized, as the infective period is probably never more than 5 days in all and the insistence on two or three weeks' quarantine of patients is absurd.

As to the course and manifestations of the disease, the swelling of certain of the posterior cervical glands was the earliest and most characteristic sign. Usually only 2 to 4 glands were involved and these differed in position. The glands were usually tender and painful and often led to complaint of stiffness of the neck. The adenitis was often present 1 or 2 days before the appearance of the rash.

The fever varied greatly, was often almost absent, occasionally quite high, especially in cases seen at the peak of the epidemic when the infection appeared most virulent. The febrile period rarely exceeded 3 days in all.

The exanthem or rash was of course the most characteristic sign. It was easily recognized when the cases were numerous, and attention to details readily distinguished it from the eruptions of true measles and of scarlet fever. The eruption varied greatly in intensity, occasionally was even hæmorrhagic. Although not noted in most textbooks, an enanthem occurred quite commonly on the mucous membrane of the mouth and throat, and was often confused with the Koplik spots of true measles. Inflamed eyes due to conjunctivitis were often found, especially in adults, and were apparently due to the eruption occurring in the conjunctiva. Stiff joints or arthritis, another rarely described phenomenon, occurred not infrequently. This usually occurred after the rash and was of short duration and not serious.

Complications were exceptional and rarely serious. Encephalitis, similar to that following real measles, was seen in several instances and was described in the New York outbreak of the previous year. Although alarming, often leading to convulsions or coma, it was of short duration and left no sequelæ. The commonest complications were otitis and pneumonia, but most of these cases were probably due to a coincident respiratory infection.

Epidemics in the wards devoted to cases of tuberculosis and of rheumatic fever did not seem to excite exacerbations of these diseases. There was no mortality, and the treatment was entirely symptomatic.

In conclusion, German measles impresses one rather as an unmitigated nuisance than a serious menace. If it were not for the eruption, the disease would be utterly negligible, as it is much less serious in course and sequelæ than the common cold. Having watched many hundreds of cases, one feels that our knowledge of the disease and its control is not advanced. One is impressed with the utter failure of quarantine and isolation to control the outbreak. This is apparently due to two factors. First, the innumerable unrecognized and unreported cases, and, second, the occurrence of infectivity before the eruption enables the diagnosis to be made. Under the circumstances the insistence on placarding the house, prolonged quarantine, and disinfection seems useless, and inflicting undue hardships on the families who are unfortunate enough to have recorded cases. The only redeeming feature seems to be that the population of Montreal and other centres in Eastern Canada is probably thoroughly immunized at present, and not likely to be bothered by the disease for some time.

EXOPHTHALMIC GOITRE IN CHILDREN.—I. Bram records a series of 128 cases of exophthalmic goitre in children below the age of 12. Although most commonly observed in adult life, Graves's disease may occur at almost any age. The sex factor is important; only eight cases in this series occurred in males. The exciting cause in children was often a focal or general infection, and in 50 per cent of the cases the teeth or tonsils were found to be infected. Enlargement of the thyroid and exophthalmos were present in every case, and tachycardia was well marked. In many cases the circulatory disturbances caused much concern, and nervousness and tremor were also exaggerated. Vomiting and diarrhœa were present in many cases. The basal metabolism was difficult to estimate accurately and generally of little value. Treatment should be conservative when possible. All infectious foci should be removed and the child given an ample low-protein diet. Prolonged rest in bed is essential, but the child must be kept contented and occupied. The author thinks that Lugol's solution may be harmful in many cases, and he states that an occasional case of simple goitre became exophthalmic in type when too much iodine was given. The drugs found most valuable were the quinine salts, eserine salicylate, and the barbiturates.—*Arch. Pediat.*, July, 1937, p. 419. Abs. in *Brit. M. J.*

HEAD INJURIES*

BY A. R. ELVIDGE

Montreal

CAREFUL management of cases of head injury is necessary if complications, immediate or remote, are to be avoided. Treatment depends upon the surgical emergency present as well as upon the type and severity of the intracranial lesion. It is important to make an immediate appraisal of the injury, for which a thorough general and neurological examination is obviously essential, including a short but pointed account of the case with sufficient past history to exclude such complicating factors as epilepsy, hypertension, alcoholism, diabetes and previous mental disease. For the purpose of discussion the subject of head injuries may be considered under the sub-headings of (1) scalp injuries; (2) skull injuries; (3) injuries to the brain and its coverings; (4) injuries involving the important spaces about the brain. In the present instance the subject is dealt with from the point of view of treatment.

Scalp lacerations. — One can hardly speak about head injuries without saying a word about scalp lacerations, however commonplace and unimportant they appear. I have practised rather radical débridement by excision of the whole of the lacerated edge and all damaged redundant tissue. The wound is cleansed with 5 per cent iodine solution which is at once neutralized by Dakin's irrigation. Contaminated instruments are discarded, and suturing is carried out with a clean set. Seldom, if ever, does one obtain infection in such wounds. In a consecutive series of "indoor" cases, taken over a four-year period, treated at the Montreal General Hospital with some modification of the above technique, there was only one of possible early infection, and in this instance the technique was not so rigidly observed. If scalp wounds are treated less radically, as is often the case, one may expect sepsis to develop in a certain number, which, if allowed to run unchecked, may on occasion give rise to the usual complications, ranging from spreading cellulitis to osteomyelitis and brain abscess. It is frequently considered that post-traumatic infection of the scalp is rare and that the scalp tends to heal well in any event. Such may be the case, but it is more common than is generally supposed. Patients are not infrequently admitted to the hospital because of scalp-wound infection, sometimes associated with severe complications.

The majority of our wounds were repaired within five to six hours of the accident, a few after a longer period, even after thirteen hours. The longer a wound has been left, the wider and more radical must the débridement be. Adequate shaving of the head about the wound and, preferably, in the male, of the whole head is important. Apart from the greater cleanliness and ease with which dressings may then be done, unsuspected abrasions and abnormalities may be discovered and treated. I have seen a severe cellulitis of the scalp develop from a minute unrecognized abrasion hidden by the hair at a great distance from the principal wound which had progressed favourably under treatment.

If a case is treated at once, after a relatively clean wound débridement may perhaps be unnecessary if adequate shaving with conscientious removal of dirt and of hair is done. Occasionally, however, under emergency circumstances wounds are of necessity quickly sutured to control bleeding and left even with hair sutured between the scalp edges. I have, on two recent occasions, found extensive masses of hair lying among bony fragments beneath healed scalp wounds. If quick suturing has been done as an emergency measure the stitches should be removed very early to relieve tension, and wet dressings applied as though the wound were already frankly infected. In addition to promoting an active hyperæmia of the part this will prevent crusting and too early sealing of the wound edges. If a depressed fracture lies beneath this may be elevated later through a new and separate scalp flap incision when the original wound is healed without infection. If less than twelve hours has elapsed since the

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From the Montreal General Hospital and the Montreal Neurological Institute.

accident, I have, in very dirty wounds, resutured after radical débridement.

Depressed skull fractures.—With regard to depressed skull fractures, those that are compound should obviously be elevated within the first few hours of the accident. As with the simple scalp lacerations, infection can be avoided if great care is taken with the débridement. In a consecutive series of cases, in the last four-year period at the Montreal General Hospital, including cases with cerebral herniation, to which others might be added from the Montreal Neurological Institute, there has been no instance of infection except in one extremely severe and complicated case where I elevated at the Institute more than thirteen hours after the injury. In this instance a mass of brain tissue had bulged through the badly torn temporal muscle, scalp and ear, and numerous bony fragments were embedded below the surface of the brain. Primary union took place, but a subsequent mild scalp infection, originating probably from the auditory passage, ensued, which cleared with treatment. On this occasion the whole of the left external auditory canal, which was extensively involved in the scalp wounds, had been laid bare along the floor of the traumatic wound. To make matters worse, this patient had had an otitis media upon this side during the previous year.

As has been said, with the simple scalp lacerations the longer the interval between the accident and the repair, the more complete and radical should be the débridement. Débridement should include damaged or contaminated dura and softened irrevocably damaged or dirty brain tissue. The removal in all instances should be as clean as possible, both to circumvent infection, and, in the case of the brain, to prevent as far as possible or minimize the meningeal scarring and subsequent susceptibility to epilepsy. To this end it is advisable to close the dura if this has been torn. This may be accomplished by splitting it into two layers. The outer layer may be turned back in the form of a flap or graft to cover the defect. Each case presents its own particular problem, and one may only voice certain principles of treatment without being too dogmatic about the details.

If depressions are not compound it is, as a rule, wise to elevate again early to avoid unnecessarily prolonged local pressure of the brain, but one may wait longer without fear of infection until the patient recovers further from the accident. If the depression is deep and is encroaching dangerously upon the brain it should be elevated as soon as conveniently possible. Very shallow depressions in silent areas, under special circumstances, might on occasion be left, provided no inwardly protruding spicules exist. These, however, may later be the site of local headache. If depressions are not elevated unexpected tears of the dura may be overlooked, with underlying brain laceration, which if left untreated will eventually cause scarring and perhaps epilepsy. A large shallow depression will decrease the size of the skull chamber, which is unphysiological, and the pulsating brain beneath may be chronically traumatized. In smaller, more benign-appearing but irregular fractures, small spicules not readily seen by x-ray may protrude dangerously inward.

Again, the depressed portion of the external table may be very small, whereas a very much larger portion of the inner table may be depressed, like the submerged portion of an iceberg, which may easily escape notice upon roentgenological examination. In a recent case the outer depressed face was only about 1 sq. cm. in area, whereas the inner was probably 1¼ square inches in area. In the presence of a skull perforation however small, with a free cerebrospinal fluid leak to the skin surface, it is obvious that the drainage tract must be repaired at once.

It is possible for a linear fracture to be depressed and for spontaneous reduction to take place. I have had one such case, in which a linear fracture extended from the front to the back of the skull on one side, involving the frontal, parietal and occipital bones and crossing the middle meningeal branches. In addition there was a line crossing the petrous bone. The skull in the parietal region above the fracture line was seen radiographically to be depressed about one-half of a cm. More especially because the depressed area crossed the motor cortex elevation was advised. A short time later, however, x-ray examination was repeated and the depression was found to have been self-reduced. At about this time also signs of intracranial tension, as judged by the pulse and the blood pressure, showed a decided improvement.

Depressions of the frontal bone are relatively common. In one such a very large proportion of the frontal bone above the supraorbital margins was depressed about 1 inch inwards.

The fracture line entered the frontal sinus, and the outer rim of the left orbit was rotated backwards. This injury was associated with a diffuse cerebrospinal fluid leak into the nasopharynx. When the patient coughed, at operation, air was forced through a relatively wide gap in the ethmoid plate, extradurally through the anterior fossa of the skull into the operator's face. In this instance the relatively wide communication through the ethmoid plate was closed with a portion of muscle. The tear in the dura, which was not large and found to be more anterior, was closed with two black silk sutures. In addition to this the same patient had a depressed fracture in a most unusual location, in the occipital bone, about 1 inch posterior to the foramen magnum on the right side. Roentgenographic examination showed two sharp pointed fragments to be pressing deeply in the direction of the posterior inferior surface of the right cerebellar hemisphere. A very large tender swelling and hæmatoma was present over the back of the patient's neck. It is of neurological interest that the man exhibited one noteworthy cerebellar sign, *i.e.*, an outward drift of the arm on the affected side. He had no demonstrable ataxia as tested by the finger-pointing tests. It is equally interesting that this "cerebellar" sign cleared only after the occipital fracture had been elevated five weeks after the first operation, and would seem, therefore, to have had no relation to the frontal fracture, which might have been supposed from the work of Goldstein. It is important to note that this occipital depression was of much greater extent than had been suspected from the x-ray findings. It involved most of the occipital bone upon this side and was depressed at the centre about one inch. The bone was shattered into some four to five fragments. The depression extended from the lateral sinus region to within one-half inch of the foramen magnum, and from the postmastoid region to within half an inch of the midline. Granulation tissue was present in two small areas, showing where the dura had been damaged, but there was at that time no leak of the cerebrospinal fluid. The dura was also under great tension, and much bleeding was encountered as in a case exhibiting high posterior fossa pressure. This tension was relieved at once when the fragments were elevated.

It is possible to have a depression fracture of the base of the skull. In the case of a man who had a depression fracture of the base of the middle fossa the surface of the petrous bone was depressed about 2 mm., which exerted pressure upon the facial nerve, with a resultant palsy. The fracture extended as a large cartwheel depression, to involve the temporo-parietal region. Eight days after this very severe injury this man sought help from his doctor because his mouth was twisted to the right and because he could not close his left eye. He was referred to the hospital at once. He was found to have a complete left facial paralysis and an early papillœdema, the precise explanation for which was not clear, unless it was due to reduced volume of the skull or cerebral œdema. Elevation of the cartwheel fracture was performed and the petrous ridge elevated to an almost normal level. His papillœdema subsided, and some sign of recovery of the facial paralysis was noted before he left the hospital.

A compound depression of the whole of the outer half of the frontal sinus, anterior and posterior wall, together with a shattering of the roof of the orbit, took place in another case. Brain presented on the side of the patient's nose. The depressed part was removed entirely, together with the shattered fragments of the roof of the orbit. In the case of a child who was struck behind the ear in a street car accident the patient was found to have sustained a compound fracture of the mastoid bone. The resulting lesion to my inexperienced eye appeared exactly like a recent radical mastoidectomy. In this instance I summoned the otolaryngologist to complete the operation. He found that the exposure was already quite adequate, and with some débridement and cleansing the patient did very well.

It has been our custom in non-compound fractures of some extent to replace as far as possible some bony fragments. In occasional compound cases we have replaced fragments of bone after sterilizing them by boiling. Old large skull defects often provoke neurasthenia, headache and fear in patients. These may be closed satisfactorily with rib grafts. The curvature of the rib lends itself well to this end.

It is important to examine carefully for depressed fractures, both by palpation and by x-ray. If there is a laceration direct inspection can be made. One may sense a false depression in the region of a hæmatoma, but, more important, it happens that real depressions are some-

times overlooked because of the lack of external and neurological signs; the brain then must continue to pulsate against the depressed fragments which may or may not be covered by dura. The overlying wound, if any, is sutured without due regard to the history of the case, which may be very suggestive, and without examining the interior of the wound. If infection occurs, disastrous results follow. If, however, infection does not occur there will still be an opportunity to elevate later, when the immediate period for sepsis is over, through a separate scalp flap, if the wound has been satisfactorily treated. As stated earlier in this account, I have recently treated two such cases. In both instances the wounds healed by primary intention, but in both hair was found later among the depressed fragments. In one of these the patient was struck on the head by a bottle which had dropped five storeys. The bottle is said to have contained javelle water and it is suggested by a humorous associate that this may have sterilized the wound. In the other instance the patient had slipped, striking his head against the point of a rock. On each occasion the history of the accident was suggestive. However, as is frequently the case in depressed skull fractures, unconsciousness did not follow, and practically no neurological signs were found except for the slight indication of a left facial weakness. On the other hand, I have treated a third patient who was not so fortunate. This time the original small laceration was infected, and subsequently an underlying depressed fracture with osteomyelitis was found beneath the wound. I saw the patient shortly after the development of a right frontal brain abscess and though the latter has been successfully drained the patient will remain an epileptic suspect.

Depressed skull fractures often give interesting local signs, some of which are only recognizable on careful neurological examination, *e.g.*, a small depression over the midline and to the right of the midline in the immediate postcentral region caused loss of sense of position in the left great toe and absence of two-point discrimination over the sole of the foot. Interestingly enough, the patient experienced paræsthesia of the left leg below the knee and foot. A small area of bluish discoloration could be seen through the dura at the point of depression. The symptoms and signs have cleared almost completely since the fragments were elevated. In a second patient, to whom I have already alluded as having slipped and struck his head against a rock, the depression caused an almost imperceptible cortical facial weakness. In a third case, previously mentioned, a lower motor neurone paralysis of the facial nerve was produced by a depression of the superior surface of the petrous bone. In a fourth case, described above, the depressed fragment pressed upon the lateral cerebellar hemisphere. This produced a single neurological sign, *i.e.*, lateral drift of the ipsolateral arm. Such findings as these demonstrate the necessity for careful neurological examination of these patients.

Immediate improvement of a local brain function may be seen after elevation of a depression even when the latter has been present for some weeks. A most significant case was one in which the patient arrived in the Montreal Neurological Institute four weeks after the injury. He had a fair-sized depression over the motor speech area, and had been well but partially aphasic since the accident. Considerable scarring had taken place beneath the bony fragments between the brain and the torn dura, and numerous large vessels were present. Though the fracture had occurred one month before admission the patient commenced to speak better on the same day after operation, showing a remarkable return of function. As soon as the fragments were elevated and the scar dissected, to relieve pain and pressure, improvement set in. How much worse might the consequences have been if the fragments had been allowed to remain even longer!

In the time available in such diffuse discussions, one may of course only mention some of what seem to the speaker to be important and practical points which, strangely enough, are points of controversy.

Linear fractures.—As regards linear fractures, those of the base are of particular importance when they allow cerebrospinal fluid to escape into the nasopharynx or into the external auditory meatus. Treatment in such cases is modified so as best to stop leakage without either blocking the pathway of escape or of causing a retrograde flow. In these instances, which form indeed a major problem in the treatment of skull fractures, one hesitates to make a lumbar puncture through which one might reduce intracranial pressure and lessen further leakage. On the other hand how can one shorten

the period of leakage safely? It is true that in most severe cases, as would naturally be expected, the leak of the cerebrospinal fluid itself reduces the intracranial pressure to a low normal figure. Nevertheless, in many cases, but not all, I have performed a lumber puncture at a time chosen for the individual case and have sometimes repeated it at studied intervals. In these cases I have refrained from reducing the intracranial pressure beyond a low normal figure and the fluid has been drawn slowly. I have in addition elevated the head of the patient's bed to a fair slope. This may be carried out in suitable stages. Naturally, in cases with a profuse leak the spinal fluid pressure may already be low. The patient is cautioned against straining of any kind, and especially in the case of a nasal leak against blowing his nose. Meningitis is a real menace in these cases. In the majority the leak stops in the first twenty-four hours, but not by any means in all. The outlook is much more serious when there has been a previous history of otitis media in the case of leaks from the external auditory meatus, or of sinusitis in those from the nasopharynx.

Under certain conditions of long-continued and profuse drainage one might consider an operative procedure for direct closure of the point of dural rupture. Such for example as was mentioned in the case of the man with the severe frontal depressed fracture in whom a small portion of muscle was placed over the point of leakage through the ethmoid plate. In the absence of a skull defect through which to work it might be justifiable to make, as suggested by Coleman, such a closure of the dural opening through a small bone flap.

Some years ago my colleague, Dr. Guy Johnson, suggested draining the cerebrospinal fluid through a clean field in the subtemporal region in cases with a cerebrospinal fluid leak through the ear. I have frequently considered the procedure, but have only carried it out in one already infected case. The patient had a rather profuse and persistent leak through the ear with signs of meningeal irritation. The operation, however, was not done until the third day, with the view not only to side-track the leaking fluid but also to help in the establishment of forced drainage of spinal fluid. In this instance, as in so many of cerebrospinal meningitis, this procedure was of no avail. I do not yet feel satisfied that it is the best method, to cure one leak by creating another; on the other hand, the procedure should be considered as a possibility.

In one unusual case the patient sustained a most extensive fracture of the base of the skull which completely severed from bony attachment the face from the skull. When the patient opened his mouth or relaxed his jaw muscles a wide gap could be felt traversing the nasal bone near its junction with the frontal. The face as a whole was freely movable upon the skull. The fracture passed horizontally backward through the ethmoid and sphenoid bones to traverse the floor of the middle fossa and to cross at least one petrous bone. The patient suffered a complete right sixth, seventh, and eighth nerve palsy and a mild hemiparesis. In association with Dr. Fitzgerald, who referred the case to me, and the oral surgeon, Dr. Walsh, the lower head was secured against the upper by a splint applied to the maxilla which was tied up to a skull cap with elastic bands. The patient recovered, but his face remained with a backward displacement of 1 to 2 mm. His spinal fluid leak lessened at once but continued for several days. The most careful attention to bed posture and to the condition of the patient's nasopharynx and accessory sinuses was continuously carried out, to avoid ascent of infection, and must be considered the most important part of his treatment.

In the absence of a cerebrospinal fluid leak in fractures which cross the petrous bone one may still note the bluish discoloration of blood behind the drum, and may find ecchymosis over the mastoid bone. These signs may not be visible until the day after the injury. In the presence of a cerebrospinal fluid leak the ear canal need not and should not be directly examined and contaminated with a speculum. A sterile sponge laid over the ear to absorb and thus prevent a retrograde flow of fluid as it trickles out is sufficient. Painting the auricle with weak iodine or alcohol may be advisable.

X-rays show their value in linear fractures crossing the middle meningeal artery, and may confirm the signs which point to the presence of an epidural hæmorrhage. Stereoscopic pictures should be taken of both sides of the skull. An x-ray of the right side will not necessarily show a fracture of the left. In cases where epidural hæmorrhage is suspected roentgenological examination should precede lumbar puncture,

which, as will be mentioned later, may be a source of danger in these cases. From fractures over the vertex one may naturally expect some bleeding from the median longitudinal sinus. Fractures of the occiput are common and frequently cross the lateral sinus. Massive subarachnoid and subdural hæmorrhage may occur in any combination and increased posterior fossa pressure develop therefrom. Such cases, as pointed out by Oddy, may occasionally require suboccipital exploration and drainage.

Lesions of the scalp and skull alone which require such varied therapeutic management form after all the lesser number of head injuries. The remainder fall into the categories of damage to the brain and its coverings, including cerebral concussion, with or without subarachnoid bleeding, cerebral contusion and laceration, intracerebral bleeding, and those involving the highly important spaces about the brain, that is to say, those cases of epidural, subdural and subarachnoid blood and fluid collections.

Brain lesions.—By cerebral concussion is meant a head injury followed by loss of consciousness. The mechanism by which the unconsciousness is brought about is still unknown. By cerebral contusion is usually meant a definite visible bruising of the brain which may be seen at operation or autopsy, and may be recognizable clinically by neurological signs, by laceration, a definite tear or gap in its continuity.

Areas of petechial hæmorrhage are seen in the majority of cases with cerebral involvement coming to post-mortem. Such areas are most commonly seen beneath the frontal poles and at the temporal lobe tips. Larger localized hæmorrhages may occur. One such discrete lesion I have had which lay between both the red nuclei. The symptomatology consisted of a combination of pyramidal tract signs and decerebrate rigidity with continued unconsciousness. The neurological localization was confirmed by post-mortem examination.

Dr. Cone has stressed the importance of the semi-rigid partitions within the skull, such as has also been suggested by Meyer, against which the brain may be made to impinge to produce petechiæ of the corpus callosum and of the cerebral peduncles. To what extent these petechiæ contribute toward unconsciousness, if at all, is unknown. The larger ones, or the larger groups, or those more centrally placed no doubt contribute to the production of general and neurological signs. For example, if they lie about the floor of the third ventricle one expects hyperthermia and autonomic imbalance. If they occur in the midbrain unconsciousness is apt to last and pupillary changes may be evident, while decerebrate rigidity may be seen when they occur in the region of the red nuclei, etc. If resorption takes place or the swelling in the neighbourhood of the centres involved subsides the patient may survive. The treatment of such conditions is principally medical, control of temperature, nourishment, fluid balance, the control of brain swelling; study of pulse, respirations and blood pressure.

Regarding cerebral concussion, early lumbar puncture with associated controlled bedrest will prevent in most instances post-traumatic headache. If much subarachnoid bleeding is found I prefer to repeat the lumbar puncture on one or more occasions to suit the individual case, even though, as found by Sprong, the blood tends spontaneously to disappear within the first five to six days unless fresh bleeding continues. Lumbar puncture is probably the most useful diagnostic and therapeutic procedure we have for the treatment of head injuries. It must be used carefully, however, and with discretion. It can especially in cases of epidural hæmorrhage be a source of danger. It would seem from our series of cases that those patients who have returned to us and those who have come to us as new patients with post-traumatic headache are nearly all those in whom for some reason or another lumbar puncture was omitted. I believe that the early puncture allows the brain to descend, causes a rupture of or may prevent formation of fine, early, pial arachnoidal adhesions.

The treatment of cerebral contusion and of intracerebral damage of all types depends upon the nature and location of the lesion. For example, the vegetative nervous system may be considerably involved. The question, as already briefly stated, is one largely of medical and symptomatic treatment and proper general supervision of the unconscious patient. The treatment of cerebral laceration is dealt with under the section of depressed fracture.

Epidural hæmorrhage.—Actual surgical measures are more apt to be used in those cases of involvement of the potential spaces about the brain, the epidural and the subdural space. The epidural hæmorrhage occurs as a rupture

of the middle meningeal artery or one of its branches. I would suggest that it may occur from accompanying blood sinuses which have been described by Thompson. I have recently noted the presence of well-formed middle meningeal sinuses in a case of brain tumour. This might account for a slower developing type of symptomatology which may be met with. In the common type the force of the arterial blood strips the dura from the bone. The result is a localized mass of hæmorrhage, which, because of its position near the motor cortex, produces characteristically an advancing hemiparesis and pupillary changes. One mechanism producing the latter, in view of recent work by Cone and Reid, is probably due to pressure upon the third nerve as a result of herniation of a portion of the hippocampal gyrus in the neighbourhood of the incisura tentorii. Apart from this there is a general rise of intracranial pressure evidenced by pulse, respiration, blood pressure changes, and an increasing drowsiness to complete the well known history of the free interval.

When the rise of intracranial pressure is great a type of extreme bilateral rigidity can result, which is due no doubt to the incidence of the cerebral peduncles against the edges of the tentorium. I have seen such a fatal state follow a few hours after a spinal puncture. Lumbar puncture in all these cases is dangerous, though as a rule necessary. But one should be prepared to operate at once after the puncture if the indications are clear. As I have stated earlier, I make it a practice in all such to postpone puncture until all else is ready, including especially the x-rays.

The course is generally rapid, and early operation is indicated. The mortality rate is high unless the case is operated upon very early, owing to the irrevocable brain damage. A patient may thus succumb even after a successful decompression has been made.

Subdural hæmorrhage.—Conditions involving the subdural space form a most important part of intracranial lesions. The symptoms arising from collection of blood here are often slow of appearance, obscure and meagre. The patients react favourably to treatment. Symptoms may develop weeks and months after the injury and last for years before detection. The injury may be slight. In acute cases there is generally a free interval much as in epidural hæmorrhage, followed by increasing drowsiness or headache. The patient may recover but may continue to have, or later develop, general headache, irritability, mental fatigue, epilepsy and psychosis. He may, or may not have neurological signs. To illustrate, may I give the summary of a case of chronic subdural hæmatoma.

In 1927 a patient was seriously injured in an airplane accident. He was unconscious for three days afterward. He recovered, but suffered off and on from severe headaches and insomnia. Three years after the accident he commenced to have certain strange psychic disturbances, probably of an epileptic nature, associated with auditory hallucinations. In 1933, six years after the accident, he developed definite attacks of petit mal and shortly afterward grand mal. He became depressed. He was studied abroad in 1933, and lumbar puncture studies were found to be normal, including pressure readings. In 1936 the patient was brought to the Montreal General Hospital as an emergency case following a bullet wound of the skull. He made a fair but only partial recovery after a critical period of some three weeks. Elevation of his depressed skull fracture was carried out, and an exploration for further intracranial complications made. In addition to the small depressed skull fracture from the recent bullet wound a very large subdural collection of blood was found enclosed in very well organized membranes. Though there was evidence of a more recent addition to the mass it was clear, grossly and histologically, that this was an organized blood clot dating from the original injury nine years previously. The membranes were removed through an osteoplastic bone flap and recovery took place.

The material trapped in the subdural space may be fluid, blood, or membranes containing bloody material. The cerebrospinal fluid presumably comes as the result of a tear in the arachnoid and is trapped. Bleeding probably most frequently occurs as the result of a tear in a vein, presumably before its entrance, for example, into the median longitudinal sinus.

It is possible that some mild cases of simple fluid collection may be cured by lumbar puncture, but those showing continued symptoms should be relieved by simple drainage through burr hole openings. In the chronic cases with a well organized sac, some likewise drain through burr hole openings. The method of incising the membranes through a small craniotomy to allow the brain to expand and cause collapse of the sac, as suggested by MacKenzie, should be satisfactory. Where the membranes are very well organized some prefer to remove them through an osteoplastic flap.

Apart from clinical examination, one may find evidence of brain displacement by a shift in the position of the pineal gland, and encephalography in doubtful cases will show characteristic findings. Air insufflation after relief of pressure demonstrates a gradual slow return to a normal

position of the ventricular system and opening of the subarachnoid space.

Time will not permit a detailed discussion of the treatment of this condition, but one may say that it is possible to have all varieties of traumatic fluid collection within this space. *e.g.*, cerebrospinal fluid, fluid blood, clotted blood, and fluid and organized blood enveloped by membranes. Treatment depends therefore largely upon the nature of the material present.

THE SURGICAL TREATMENT OF FACIAL INJURIES*

By Fulton Risdon

Toronto

IN this short paper no attempt is made to deal with cerebral trauma, such as hæmorrhage, contusions or lacerations of the brain substance, but it is my purpose to deal with injuries of the face, including the supporting bony structures. I am of the opinion that all displaced bones about the face should be replaced at the earliest possible opportunity. This may mean neglecting the care of the contused wounds until the underlying bony structures are elevated to their normal contour. When the patient has been severely injured prompt attention should be given to the treatment for shock, then consideration of injuries other than facial, and finally the care of injuries about the face including the supporting structures is to be planned.

The Cleansing and Care of Wounds

Contused wounds of the face require special care, as all foreign bodies, such as dust and particles from the road, should be removed with a hand brush and green soap and peroxide before any attempt is made to approximate the incised areas; this is best done under a general anæsthetic. Generally speaking, the edges should not be trimmed unless they are badly torn, as considerable tissue which may appear devitalized will live. At this time we should plan for future excision of the scars should that prove necessary, rather than lose tissue which will be of value later, and especially does this apply around the eyelids and the nose. There are two suture materials that I favour, the first and finest of which is the so-called "plastic suture" which I believe to be a Japanese fibre, or the very finest dermal; the other is horsehair. My reason for favouring these sutures is that they are easily removed, and act as a miniature drain if not tied too tightly. On completion of the approximation of the wounds with small needles, anti-tetanic serum, 1,500 units, is liberated in the wounds with a hypodermic syringe in divided doses. If there is a special nurse on the case, I have small sterile applicators prepared and serum is not allowed to collect over the sutures. Otherwise, I use small strips of lint held in position with liquid adhesive. No other dressing is employed.

Fractures of the Nasal Bones and Associated Parts

Due to the automobile accident depressed fractures of the nasal bones are quite common. In these cases the nasal bones are forced into a posterior position along with the nasal spine, the nasal processes of the maxillary bones, and the upper bony section of the septum into a close relationship with the cribriform plate, but in my experience the cribriform plate is seldom perforated. When such an injury occurs and the

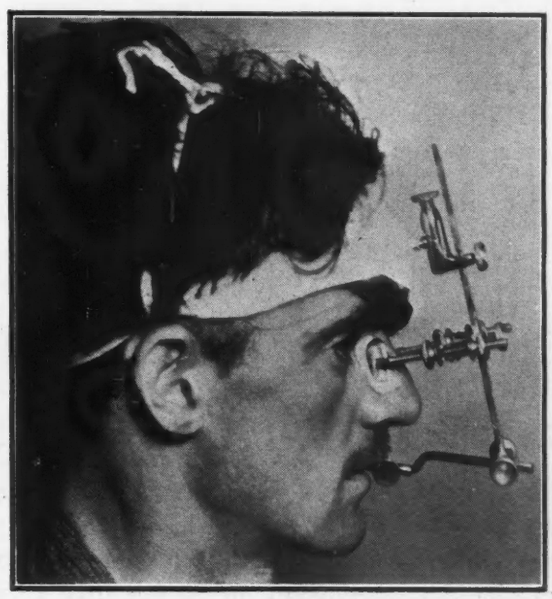

Fig. 1

* A paper read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Ottawa, Section of Surgery, June 23, 1937.

patient's condition warrants it immediate correction can be done by finger manipulation. With a gloved index finger, under a general anæsthetic, the parts can be moulded and returned to their normal position, and maintained there by a splint which is held in position by one section on the forehead and the other on the upper teeth (see Fig. 1). (This splint will be described at greater length later).

FRACTURE OF THE MAXILLÆ

The common injury is a bilateral fracture of the maxillæ *en masse*. In these cases the entire upper jaw is carried to a posterior position due to fractures of the nasal bones, nasal processes of the maxillæ, infra-orbital borders of the orbit, anterior walls of the antrum, and, in most cases, the pterygoid processes of the sphenoid bone. It is quite obvious that there will be a marked depression of the middle section of the face, and advancement must be attempted at the earliest possible opportunity. This is quite satisfactorily accomplished when the patient has upper teeth, as in most of these cases the lower jaw is intact and may be used as a splint, and quite the reverse of a fracture of the mandible when the upper jaw is used as a splint. In treating these depressed fractures of the upper jaw *en masse* a cast Victoria metal splint is made to fit all the upper teeth, and on the outer surface, starting at the molar, a snake wire is soldered from the right molar to the left molar and the same is made for the lower jaw. Then under a general anæsthetic the upper jaw is forcibly carried forward to its normal position by a wire around the upper anterior teeth and fixed to the lower jaw; that is, wires pass from the cemented splint on the upper jaw to the cemented splint on the lower jaw and are twisted together. A further aid is a rubber dam bandage, six inch sheet rubber, as used by the dentist, which is tied around the chin and over the parietal area of the head, and in this way the lower jaw is kept in apposition to the upper. This position is maintained for three to five weeks. When the patient is edentulous the problem which confronts the operator is what method to use to maintain the upper jaw in a forward position. Generally speaking, that can be held by a plaster of Paris head bandage with thirteen to fifteen gauge bars incorporated in the plaster bandage, and brought downward to permit the wires being thrown around the upper jaw. By tightening these wires over the bars from the head bandage the upper jaw is secured. Many other methods for holding these forward have been devised but in my opinion they are too complicated and are quite unnecessary. Fortunately, on this continent most of our patients have teeth which may be utilized in splinting.

FRACTURES OF THE MANDIBLE

Fractures of the lower jaw are perhaps the most common accident met with today in facial injuries. In all fractures about the jaws the occlusion, or in other words the way the upper teeth meet the lower teeth, has to be considered as guide for the proper reduction. When the dentist speaks of occlusion he means that the upper teeth interdigitate with the lower teeth in their normal position. In all fractures of the lower jaw properly taken x-rays (I prefer stereoscopic) will show the amount of displacement and comminution if any, and whether there are teeth in the line of fracture. Speaking generally, all teeth in the line of the fracture should be removed, but in many cases they may be saved for a week or ten days to assist in maintaining proper relationship of the lower and upper teeth. To maintain this occlusion many types of wiring and splints have been devised but they can be mainly divided into two. The first, a cast splint; that is, an impression is taken of the teeth and a splint is cast of Victoria metal to fit accurately the teeth, and it may be necessary to cast one for the upper as well as the lower. Then to this splint, snake wire is soldered on the labial or outer surface, so-called because of spaces which are left for inter-dental wiring, and then the upper and lower splints are ligated together. This is a very useful method, but expensive and rather difficult to apply, but it is necessary in some cases. I have the splints cast by a dental mechanic and then cemented on with black copper cement. Victoria metal is supplied by the dental supply houses, and I understand is an alloy of zinc and copper but the formula is a secret one. The other method, and the one which I prefer, is wiring. That is, wires are applied to the upper teeth in such a way as to make loops between the teeth, and the same on the lower and inter-dental wiring maintains the lower to the upper.

I have recently devised a method which appears to me to be much simpler. That is, heavy bronze wire, which may be obtained from the

dental supply houses in fourteen-inch lengths, is thrown around the upper second molar and twisted on itself from that position along the outer or labial surface of the upper teeth and brought well beyond the angle of the mouth, being held there with an artery forceps. The same is applied to the opposite side of the maxilla, namely, wire applied to the molar area and twisted on itself until it meets the wire from the opposite side and the two are then twisted together in the centre line. Individual teeth are then wired to this twisted arch and the same type of splint is applied to the mandible. That means we have a twisted wire from molar to molar on the upper and lower jaws with each individual tooth wired to the arch, and inter-dental wires are used to hold the so-called occlusion or approximation of the lower teeth to the upper teeth. This simple method is applicable in a great percentage of cases, and with experience a number of variations will become apparent. I am of the opinion that it is the most flexible method introduced so far, and it can be utilized in the operating-room at any time to fit almost any type of fractured jaw. Three to five weeks are necessary for bony union. Fractures of the condyle may be a complication, and I believe that the head of the condyle can be manipulated into position. By using this inter-dental wiring an excellent functional result may be obtained without operation, as with removal of the condyle there will be a certain loss of the normal excursion of the lower jaw. The only special consideration is that movement is started earlier when there is a fracture of the temporo-maxillary articulation. I am especially interested in this type of treatment because bone wiring is sometimes attempted, generally resulting in failure, or the head is excised, neither of which procedures I believe to be necessary.

FRACTURES OF THE INFRA-ORBITAL RIDGE, MALAR BONES AND ZYGOMATIC PROCESS

Much has been written recently on the treatment of this type of fracture, and many ingenious methods have been suggested. Most of these I find applicable in the very simple case, usually that without comminution. When the bones in these areas are comminuted there is in my opinion only one good method of holding the small sections of bone. That is by supporting the restored minute pieces of bone with iodoform gauze packing in the antrum of Highmore, leaving them in that position for eight to ten days. If there is a simple fracture through the zygoma it is quite easy to elevate within the mouth, and the same I believe for the malar bone, but some method as a rule must be devised for maintaining the elevated bones. I have found simple elevation to be insufficient, as specific gravity and the weight of the muscles drag the elevated bones to a lower position. In other words it is easy to elevate the infra-orbital ridge, the malar bones and the zygoma, but difficult to maintain them in position. A further suggestion for maintaining them would be to use a plaster of Paris head bandage with perpendicular pieces of wire incorporated in the bandage before it sets, dropped over the zygoma or the malar bone on that side, and wires are then arranged from this bar to the fractured part. I have found the method of supporting the infra-orbital ridge and malar bone through the antrum most satisfactory.

There is another and very definite consideration about facial cases, namely, where tissue has been completely removed. There may be a section of the ala or of the upper lip, loss of the soft tissue in upper or lower eyelids, total loss of the nose (as in one of my cases), and in another, complete loss of an auricle. I am unable to completely outline the repair of such cases at this time, but, generally speaking, when a section of the nose has been lost and it is evident that tissue will have to be supplied to restore the contour I would suggest sewing the mucous membrane to the skin, preserving the original loss and in this way preventing the usual contraction due to scar tissue. Later when the patient's condition warrants it, plans are made to bring a pedicle flap, or a direct flap to restore the loss, and if skin only has been lost, a Wolfe graft should be attempted, as the colour is more like that of the surrounding tissue. If the soft tissue overlying the mandible is lost at the same time that there is a non-union of the lower jaw it is more practical to reconstruct the neck before attempting a bone-graft, and grafting should be delayed until a period of six months has elapsed after the last evidence of suppuration.

There is another type where the injury to the nose is sufficient to cause loss of the septal cartilage. In this case drainage of course is instituted early and the necrotic cartilage is

removed if necessary. Then a period of four to six months should elapse before any attempt is made to restore the contour or bridge of the nose. When this is attempted I am convinced that the best material to use is cartilage, although I am aware that bone is used more now than it was some years ago. My reason for this statement is that I have followed cartilage buried in a patient for fifteen years, and on removal and sectioning the cartilage existed as such, whereas bone had disappeared much earlier; even at the end of one year, there is very little to be found, due to sterile atrophy. In making a nasal cartilage repair I always prefer to do it through the columella, but there are some cases, especially where the nares are depressed, when the columella will have to be divided at its attachment to the upper lip and thrown well up over the nasal tip to allow for the cartilaginous support to be inserted so as to restore the bridge as well as the columella. We obtain the cartilage from the rib area, observing strict technique throughout. This part of the operation should be completed before approaching the nasal area.

I mentioned above a nasal splint which is used as a rule for the correction of an old nasal deformity, by which I mean that the nasal bones have been fractured and left in an abnormal position and now require refracturing and probably elevation. In all these cases a splint is necessary, and the one which I would suggest is a flat section which is attached to the forehead, held there by plaster of Paris bandage or adhesive. Another section is attached to the teeth with an upright extending beyond the elevation of the nose, and then a bar is dropped from a flat part of the splint on the forehead to the attachment on the teeth (see Fig. 1). This merely gives us a fixed appliance over the nose and to this is attached an adjustable splint which maintains the nose in an elevated position, and if further elevation is necessary there is an attachment to this splint which operates intranasally, but I find that seldom necessary.

A SOLUTION TO THE MYSTERY OF "CHRONIC APPENDICITIS"*

By W. A. Bigelow, M.D.

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THE object of this paper is to give a report from our Clinic of the end-results of operation on the so-called congenital bands and membranes of the cæcum and ascending colon, including the hepatic flexure.

A questionnaire was sent out in January, 1937, to only those on whom appendectomy had been performed elsewhere, previous to operation at this Clinic, to cure a chronic right-sided abdominal pain, and in whom the diagnosis had been made of "chronic appendicitis". None of the patients included in this report had experienced any relief whatever from the appendectomy performed. Great care was taken to exclude all cases which had been diagnosed and operated on for acute appendicitis. The patients were operated on by our usual method of complete removal of all so-called congenital bands and membranes from the cæcum or ascending colon, or hepatic flexure, or any combination of these present.

One hundred and forty-seven patients responded to this request, which asked only one question, *viz.*, "Have you been completely relieved of your right-sided pain since your operation for bands at this Clinic?" One hundred and thirty-six reported complete relief from right-sided pain; eleven reported, not cured. This gives a result of 92 per cent cured by this operation.

Evidence of Existence of Bands and Membranes of the Cæcum and Ascending Colon

Bueermann[1] gives an exhaustive bibliography of writings on the subject of bands and membranes of the colon and terminal ileum. Going back into history the following men write from the standpoint of pathological anatomy of the colon concerning developmental defects found in the normal and abnormal attachments of the right half of the colon and lower ileum, *viz.*, Soemmering, Virchow, Toldt, Treves and Jonnesco. The following have described and reported cases of so-called chronic appendicitis,

* Read before the Manitoba Medical Association at Winnipeg, May 20, 1937.

associated with omental, gall-bladder, appendiceal, colonic and ileal membranes and bands, and in which cases colicky right-sided abdominal pain and other symptoms of partial obstruction of the bowel were manifest. Removal of the appendix only, in the presence of constricting membranes of the right half of the colon, was found to mean a persistence of the major symptoms—Riedel, Lounstein, Hochenegg, Haberer, Jackson, Lane and Harvey.

To illustrate the gross appearance of the bands and membranes, as seen at operation, we submit these photographs, taken at the time of operation, as shown in Figs. 1 and 2. The surgical technique of the removal of these bands, is referred to in a previous paper.[2]

Two previous "call-in" reports were published by this Clinic.[3] The first gave very favourable results from 105 responses; the second[2] also gave a complete cure from right-sided pain in 93 per cent of the 520 responses.

This report, called in January, 1937, is summed up as follows.

ANALYSIS OF CALL-IN REPORT

147 answers to 169 requests.
136 reported cured.
11 reported not cured.
92 per cent cured of right-sided pain.

Of the 11 cases reported *not cured* 4 were re-examined at the Clinic with the following results.

Two patients gave evidence of post-operative peritoneal adhesions from post-operative peritonitis. These two were re-operated on and cured.

One case, on re-examination, was diagnosed as neuralgia of the iliohypogastric nerve.

One patient had no pain after leaving the hospital until subsequent pregnancy and confinement, so reported similar right-sided abdominal pain.

Seven patients did not come back for check-over.

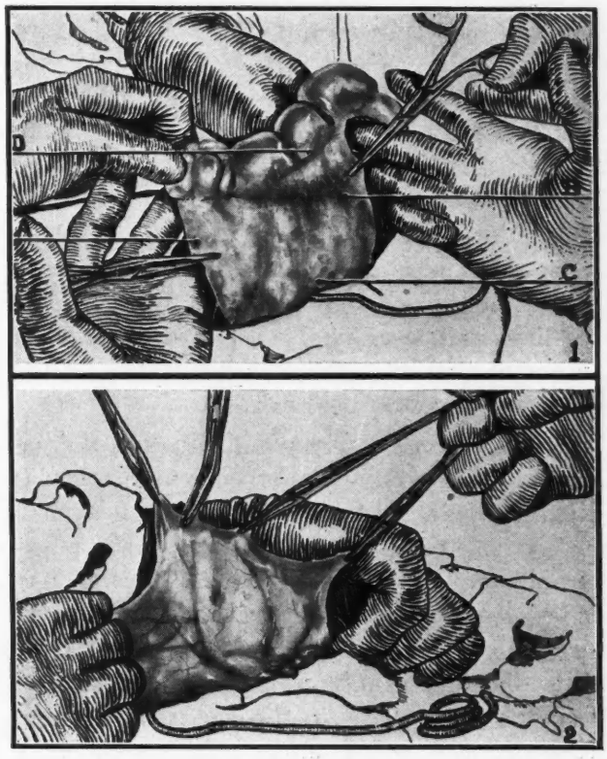

Fig. 1.—Represents bands under tension, previous to cutting.

A—Superior border bands.
B—Inferior border bands.
C—External lateral border of bands.
D—Represents the colonic attachment of membranes.

Fig. 2.—The forceps are on the free edge of bands after their separation from the colon.

CONCLUSIONS

1. That the so-called congenital bands, membranes and folds of cæcum and ascending colon sometimes occasion pathological symptoms. The main and outstanding one is right-sided abdominal pain.

2. That this main symptom of pain is curable by properly performed surgery, with proper post-operative treatment.

3. That failure to recognize this will explain some of the failures to cure "chronic appendicitis" by appendectomy.

4. That to get results, no other operative field should be employed and no exploration of the abdomen done after the band section has been started.

5. That these bands and membranes do not reform if once thoroughly and properly removed.

6. That adhesions may form, and do form again, if these surgical principles are not carefully carried out.

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BASAL PULMONARY LESIONS*

BY HERBERT R. CORBETT, M.D.

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ROENTGENOLOGICAL examination of the chest, on account of the varying opacities and densities, offers a wide field for investigation and accurate diagnosis. Improved technique, resulting from the perfection of apparatus, has permitted the production of chest films that would not have been considered possible a few years ago. But the distribution of x-ray apparatus far exceeds the distribution of knowledge of x-ray interpretation. After installation of equipment many physicians have realized that x-ray diagnosis is an art and a science to be gained only by study and experience, not a gratuitous endowment bestowed by the manufacturers. The public is becoming chest-conscious as well as cancer-conscious, and it is not difficult to induce them to come forward for x-ray examination.

In the short period at my disposal it is obviously impossible to discuss or even summarize all the various conditions that may produce basal infiltration. Therefore I wish to deal with the common diseases occurring in adults, and to stress from a roentgenological aspect the technique employed in bringing such cases to a diagnostic conclusion.

The more commonly recognized lesions that produce increased density in the lower pulmonary field are: (1) lobar pneumonia;[1] (2) influenzal pneumonia; (3) bronchiectasis; (4) lung-abscess; (5) tuberculosis; (6) chronic interstitial pneumonia; (7) neoplasm; (8) mycotic infections. This list is an arbitrary one, although it includes the more common pathological entities. No one disease remains specifically basal, any more than tuberculosis, for instance, is always apical or subapical. C. B. Peirce (personal communication) states: "The common pulmonary lesions beginning in the lower half of the lung field are, in order of importance: (1) minimal or subclinical lobular pneumonia; (2) bronchiectasis; (3) pulmonary abscess; (4) primary malignancy; (5) tuberculosis.

Some authorities[1] state that if the mottled shadows of tuberculosis were characteristic one should be able to differentiate them from those of chronic non-tuberculous infections. It is my personal opinion that those of us who have made a study of many chest films recognize and appreciate the fine flocculent type of mottling and the small moth-eaten areas of cavitation which characterize early exudative tuberculosis. But such recognition and differentiation come only from experience.

It is a fact that clinical and necropsy studies in adults reveal that tuberculosis is responsible for at least 90 per cent of all chronic lesions in the upper third of the lung. When the lesions are in the apex of both lungs tuberculosis is responsible for an even higher percentage. Conversely, a lesion in the lower third of the lung is in 90 per cent of cases found to be non-tuberculous, and when both bases are involved it is even more apt to be of other etiology. According to our records the incidence of localized unilateral basal tuberculosis, confirmed by the finding of tubercle bacilli in the sputum, is approximately 3 per cent.

Basal tuberculosis must be distinguished from the following: influenzal pneumonia; bronchiectasis; lung abscess; neoplasm; post-pneumonic fibrosis; lobar pneumonia; fusospirochætal pneumonia; passive congestion, and other rarer conditions such as actinomycosis and pulmonary syphilis. The differentiation will be easier if there should be an upper lobe infiltration resembling tuberculosis in the contralateral lung. However, this is not always diagnostic, for a cross infection due to some other lesion may be present.

Influenzal bronchopneumonia (subclinical pneumonia).—The existence of a small patchy area or areas of bronchopneumonia associated with severe colds, particularly in children, adolescents and young adults, occurs more often than is realized. The majority of such patients are treated at home, consequently we see only a few in the acute stages. The film appearance, as we see it, consists of a lobular consolidation

* Read at the Annual Meeting, Canadian Medical Association, Section of Radiology, Ottawa, June 24, 1937.

of moderate density and varying size, with irregular and poorly defined margins, very similar to the confluent tuberculous lesion seen in the upper lobes. Occasionally these lobular areas coalesce to form pseudo-lobar consolidation which cannot be distinguished from true lobar pneumonia. Although the rapid clearance of the shadow of suspected influenzal pneumonia may be regarded as proof of its non-tuberculous character, we must bear in mind that in occasional cases there is an imperfect resorption of the exudate, together with interstitial fibrous changes, which may cause a persistence of the x-ray opacities for some time, necessitating laboratory and opaque oil studies. Basal tuberculous lesions do not, as a rule clear up rapidly; they usually extend and excavate. While the identification of tubercle bacilli in the sputum is the final factor in the diagnosis of basal tuberculosis it is not always possible to obtain a positive sputum until some time has elapsed.

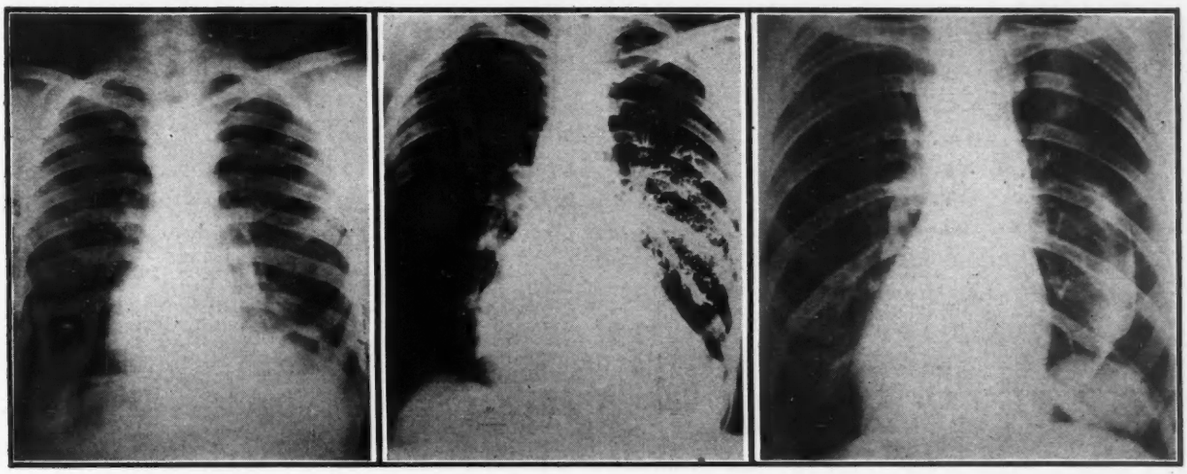

Fig. 1 Fig. 2 Fig. 3

Fig. 1.—Note the moderate-sized thick-walled tuberculous cavity in the right lower lobe, situated just above the diaphragm. The remainder of lung is free from disease and the left lung appears healthy. Sputum, Gaffky 5. **Fig. 2.**—Right lower lobe, cylindrical and saccular bronchiectasis. Lower lobe bronchus injected with lipiodol. The triangular opacity occupying the lower and inner third of lung field is the so-called "basal triangular shadow" representing an atelectasis. On the original film the dilated lower lobe bronchi in this area could be seen. **Fig. 3.**—A fibrin body in the right pleural cavity. These occur in patients who have been receiving pneumothorax complicated by pleural effusion. They are usually rounded and smooth, lying free on the diaphragm or attached at one end to the visceral or parietal pleura. They contain microscopically a central nucleus of dense compact fibrin formed by blood, pleural effusion, or combination of the two. Our incidence has been one in three hundred pneumothorax cases studied.

Acute lobar pneumonia.—It is not the purpose of this paper to discuss the roentgenological appearance of this disease, for we do not see many typical cases, except in general hospitals. The clinical findings are self-evident; and, commonly, it is only when complications develop or an empyema is suspected that an x-ray study is made. A pneumonic process may take any of three possible courses; the exudate may be resorbed and recovery ensue; the exudate may be organized with the development of fibrotic changes; or suppuration may occur. If either of these two latter possibilities ensue, chronic terminal conditions may be expected, which may take the form of bronchiectasis, abscess, or fibrosis, massive or diffuse in type. Follow-up x-ray studies of the slowly resolving pneumonic process will throw considerable light on the incidence of such terminal conditions and afford more accurate prognosis.

Bronchiectasis, one of the most basal lesions, presents a characteristic appearance. Prior to the development of lipiodol by Lafay, Sicard and Forestier[3] in 1926 the diagnosis was made in 50 to 60 per cent of the cases, and was possible only when the clinical history of an etiological factor, profuse expectoration and certain characteristic changes at one or both bases, presented.

The universal use of one or other of the diagnostic oils now on the market leaves little room for doubt, but there is one point I wish to bring up for discussion, that is: What constitutes first-stage bronchiectasis? Are we to regard the slightly dilated larger branches as evidence of a chronic bronchiectasis? I have found a close connection between chronic

bronchitis, clinically diagnosed as such, and bilaterally dilated lower lobe trunks that do not lose their calibre as they approach the middle and outer zones of the lung field, suggesting that the lipiodol findings of early bronchiectasis and bronchitis are similar.

STUDY OF 100 CASES INVESTIGATED WITH OPAQUE OIL

TABLE I.

Normal bronchial tree	57
Suspected early bronchiectasis	2
Chronic bronchitis	10

TABLE II.

Of the 31 cases positive for bronchiectasis:	
Unilateral	25
Bilateral	6

TABLE III.

Location of lesion in unilateral cases:	
Right lung	10
Left lung	15

TABLE IV.

Lobes of lung involved:	
Upper	4
Middle	3
Lower	24

TABLE V.

Type of dilatation:	
Saccular	15
Cylindrical	10
Mixed cylindrical and saccular	3
Fusiform	1
Isolated cavity	2

In the literature of the past few years, articles have appeared mentioning the significance of the so-called "triangular basal shadows" (Fig. 2). As far back as 1926 Singer and Graham called attention to this condition calling it an atelectatic lower lobe. Sante[4] also refers to it. Richards, of Toronto,[5] says: "In a review of 2,000 consecutive routine chest examinations this finding has been encountered on ten occasions". The same writer, in quoting Kerley's paper, says that a well developed fourth lobe situated at the base of the lung is met with in 15 per cent of normal persons. In my experience I have never found anything but an accessory azygos lobe on autopsy, and I wonder whether the so-called accessory lobe at the base is not a lobular consolidation, pleuritis or localized atelectasis. When a triangular shadow is found a differential diagnosis must be made from mediastinal pleural effusion. This can usually be done by having a postero-anterior film with heavy exposure made, which will demonstrate the small trabeculated honeycombed areas. These can be later demonstrated by lipiodol examinations.

With opaque-oil bronchography it will be noted that the oil is evacuated from the lungs within 24 to 48 hours in the case of frank bronchiectasis; as a matter of fact most of it drains out immediately. In the normal lung the alveoli are filled and absorption takes place slowly. Usually several months will elapse before all traces have disappeared. Occasionally there is a localized reaction from the oil, resembling a bronchiolitis, which is probably due to lymphangitis and lymphadenitis as a result of simple foreign-body reaction. The similarity of the roentgen appearance of lipiodol reaction to other pathological processes is often confusing unless the history of the above-noted investigation is known.

Lung abscess. — The changes noted in this condition depend on the stage of the disease. In the acute phase the findings resemble an ordinary pneumonic process, and they cannot be differentiated from this on a single examination. However, on serial films the progress differs somewhat from ordinary pneumonia, in that the opacity becomes denser and tends to become rounded or demarcated at the edges. Cavity formation soon becomes evident; there is something about the appearance of the cavity that is typical; it is like a clear-cut, punched-out area without the usual irregularity of the tuberculous cavity or the dense nodular wall of the necrotic primary carcinoma. The early cavities of tuberculosis are moth-eaten and irregular, due to liquefaction necrosis of confluent tubercles, and situated in the centre of a soft mottling or confluent process. Lung abscesses usually contain fluid, and a shifting level can be demonstrated fluoroscopically. With healing the area of infiltration surrounding the cavity becomes smaller, and not uncommonly only a linear scar remains. When the cavity alone remains, which is rare, it is due to a lobular ectasia in a resolved confluent lobular pneumonia.

If we analyze a sufficiently large number of cases with respect to the localization of the disease, a distinct difference will be found to exist between the acute aspiration or post-operative abscesses and the chronic pneumonic type. The former usually involves the upper lobe or the apex of the lower lobe. In the latter area the position is largely due to the dorsal direction of the posterior branch of the lower lobe bronchus, on each side, affording a sort of

"sink hole", with the patient recumbent. The chronic pneumonic type of abscess usually involves the lower lobe. Localization for surgical treatment, and diagnostic pneumothorax, to determine whether the affected area of lung is adherent, are important.

In the acute stage lung abscess must be differentiated from lower lobe pneumonia. Here the consolidation of pneumonia spreads rapidly, while that of lung abscess spreads slowly, usually requiring weeks. Chronic lung abscess must be differentiated from tuberculous cavities and neoplasm. The history and sputum examination offer assistance. It will be found rather difficult to fill an abscess cavity with opaque oil, but the area can usually be outlined.

Pulmonary carcinoma. — Primary malignant disease of the lung should be included in our differential diagnosis of basal lesions, but it should not be classed as one primarily basal. It is frequently difficult to make a distinction between acute or chronic infective processes and early malignancy. When the textbook appearances of carcinoma do occur the condition is usually well advanced; unfortunately for the patient, that is when most of our cases are first seen.

In his discussion of primary carcinoma Peter Kerley[6] divides the condition into the hilar and pneumonic forms, the latter varying with the lobe or lobes affected. He states that in the case of either the right or the left lower lobe the greater fissure is seen to be nearer the spine in the lateral view. Two opacities are seen in heavy penetration, one attached to and spreading from the hilum, the other, less dense, and covering the affected lobe in all directions. If the vascular markings of the lung are visible in the light peripheral opacity as well as in the dense opacity near the root cancer can be diagnosed with certainty. If there is displacement of the mediastinum to the affected side, especially noted on fluoroscopic examination during respiration, the presence of bronchial stenosis, one of the most common results of carcinoma, may be strongly suspected. Again, we have bronchography with opaque oil to help us demonstrate the presence of bronchial stenosis or complete occlusion.

TECHNIQUE

It would not be fitting to bring this paper to a close without a short reference to the technical aspect of chest radiography. Dr. Ezra Bridge,[7] the Iola Sanatorium, New York, in speaking before the National Tuberculosis Association, has this to say: "The use of high current of the general order of magnitude of 1,000 MA should bring contrast or tissue differentiation near the high point of usefulness; the use of 7 or 8 feet distance reduces distortion to a satisfactory minimum, and an exposure time of 1/30 sec. or less with adults, and 1/60 to 1/120 sec. with children, stops the effect of movement to an extent beyond which little is gained from a practical standpoint unless synchronization is used." This statement seems to demonstrate the fact that distortion and blurring from heart action and arterial pulsations are more prone to occur at the bases of the lungs.

It will be noted fluoroscopically that the lung tissues near the heart tend to follow the movements of the heart itself, but lag behind the more rapid movements. The greatest lung movement is near the apex of the heart and the excursion of the lung tissue at this point appears to be half that of the heart cycle (end of systole and beginning of diastole) the speed of the lung tissue is roughly one-eighth the maximum speed during the heart cycle. MacPhedran and Weyl synchronized the roentgen exposure with the time of minimum movement and the sharpness of detail was increased by half.

In passing, I wish to mention briefly some facts concerning a recent addition to our diagnostic x-ray equipment which has opened up many possibilities and may soon become standard equipment in large chest clinics and hospitals where thoracic surgery is done. Some of you have heard of the intrascope[8] or planigraph of the Siemens-Reiniger Co., Montreal. In brief, it is an instrument for taking x-ray exposures of the chest in thin tissue layers. Its advantage lies in the detection and localization of pulmonary cavities.

In the standard postero-anterior examination of the chest the cardiovascular shadow obscures the lung parenchyma occupying the inferior and medial margin of the left lung, including the retrocardiac area and the paravertebral quarter on both sides. In a surprising number of instances we are checked up by clinicians who with great glee point out signs of cavitation or consolidation in this area noted on clinical examination. The region can be

demonstrated by films in the right and left oblique as well as the true lateral. We usually check up all cases fluoroscopically, and if a lesion is suspected take special films.

SUMMARY AND CONCLUSIONS

1. A brief analysis and differential diagnosis of the common basal pulmonary lesions has been considered.

2. The possibility of error in roentgenological diagnosis is much greater when the lesion shows a basal distribution than when it is confined to the upper areas of the pulmonary field.

3. In the diagnosis of basal tuberculosis a guarded opinion should be given, and a correlation of clinical, x-ray, and laboratory findings completed before a final statement is made.

4. As it is the custom of the internist to observe the progress of the case from day to day, the radiologist should be afforded the opportunity of conducting serial film examinations.

5. The radiologist must increasingly develop his abilities to the point that he will enjoy, as a consultant, the confidence of his colleagues and the public. Cooperation is essential today as never before in order to further the aims of medical science, namely, the alleviation of suffering and prolongation of life.

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THE MANAGEMENT OF ŒSOPHAGEAL DIVERTICULA

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THIS paper will deal only with pulsion diverticula originating at the pharyngo-œsophageal junction.

PATHOLOGICAL ANATOMY

As described by Mayo, these are the result of a hernial protrusion of the pharyngeal mucosa through the triangle of Lannier. This triangle is only present in a small percentage of cases, and results from a degeneration of the oblique fibres of the inferior constrictor muscle as they criss-cross one another to form the posterior raphe. The base of the triangle is formed by the upper constrictor fibres of the œsophagus. Being the result of a degenerative process, they are found almost entirely in elderly patients. The bolus of food, before it is grasped by the œsophageal muscles, is thrown against the posterior pharyngeal wall at this weak point. It is easy to understand, therefore, why a small protrusion of mucosa will gradually develop. As this enlarges it descends into the neck and accumulates other fascial and fibrous coats. In almost all cases it descends on the left side. It lies beneath the thyroid and all its vessels and behind the pre-tracheal layer of fascia, so that it is guided behind the clavicle towards the dome of the pleura and into the posterior mediastinum. When the apex extends below the clavicle it travels toward the midline and descends into the thorax posterior to all the great vessels, including the arch of the aorta. Any descent below this point is blocked by the presence of the bifurcations of the trachea and the pulmonary vessels.

DIAGNOSIS

The diagnosis is comparatively easy. The following points are very suggestive: (*a*) difficulty in swallowing, with audible splashing sounds; (*b*) the almost continuous regurgitation of mouthfuls of undigested food after meals; (*c*) in advanced cases, the feeling of weight in the upper chest, accompanied by burning and pressure symptoms; (*d*) loss of weight occurring in a man without cachexia or loss of appetite; (*e*) when a catheter is passed it nearly always goes into the diverticulum. An x-ray picture is diagnostic, and the lower rounded pouch-like border of the barium shadow is characteristic.

PRE-OPERATIVE TREATMENT

The diverticulum should be washed out, using a catheter and a syringe. Normal saline, boracic, or soda bicarbonate solutions are usually sufficient to remove clinging mucus and render the sac as clean as possible. The capacity can be measured at this time and the diverticulum should not be filled more than three-quarters full of the washing fluid before it is aspirated. It should be washed out from four to six times during the day before operation, and should be aspirated one hour before operation. These patients are usually dehydrated and weakened from loss of food. On this account, 2,000 to 3,000 c.c. of glucose in saline should be given intravenously for a few days before operation.

OPERATIVE MANAGEMENT

These patients are always thin, and for this reason the operator has to be exceedingly careful and realize that he is operating upon a very vulnerable part of the neck. The incision is made from a point three-quarters of an inch above the insertion of the sterno-mastoid upwards along the anterior border of this muscle for a distance of about three and one-half inches. If one is careful the external jugular vein can be spared by drawing it outwards. At the upper end of the incision the descending branches of the transverse cervical nerve will be met and can be retracted upwards. At this point will also be seen the sterno-mastoid branch of the superior thyroid artery, this being a very constant and sizable vessel. The incision is carried down to the deep fascia with the scalpel, and from then onwards blunt dissection should be resorted to. Blunt Mayo scissors can be used to go through this fascia by spreading the blades, and it will be found fairly easy to drop into the space between the great vessels of the neck and the thyroid. The middle and inferior thyroid veins will have to be ligated. The infra-hyoid muscles will be seen stretching between the sternum and the thyroid and hyoid cartilages. The anterior belly of the omo-hyoid will also be encountered and this muscle should be retracted upwards and outwards. This manœuvre enables the operator to open up the deep cervical space with the dome of the pleura on the outside, which can be seen rising and falling. The great arteries and veins of the neck are forward under the sternum and to the inside lie the trachea, the œsophagus, and the bodies of the vertebra. Posteriorly will be seen the necks and bodies of the ribs covered by the intercostal muscles. In this space the diverticulum must lie.

The fingers and a non-toothed finger forceps are the only instruments that should be used at this stage of the operation. There are many layers of fascia, but, being denuded of fat, they are fairly transparent, and after burrowing through a few of these layers one can recognize the diverticulum on account of the white appearance of its surface. The pleura can be seen rising and falling with respiration; the œsophagus is red; the trachea can be recognized by its rings, and one cannot very well mistake the characteristic creamy-white appearance of the surface of the diverticulum. Contrary to the common conception, there are not many large vessels to give trouble in this area. Of course one can feel the arch of the aorta with its large ascending branches, but all manipulation takes place behind these structures in a space commensurate with the size of the existing diverticulum. Unless there has been a great deal of inflammation adhesions are very few, and in the writer's cases there was no trouble with any bleeding due to adhesions. If adhesions are present it is necessary to free the diverticulum by going down posteriorly to its apex and gradually strip it off the anterior structures from below upwards. There is considerable space, and with the aid of proper light any troublesome bleeding can easily be seen. The space permits one to tie off. As the diverticulum is lifted from the bottom of its bed the sympathetic cord may be seen posteriorly, and some very strong thread-like structures will be stripped off the wall with the gauze sponge. It is not advisable to divide these. It is possible that these may be the upper, middle, and deep cervical cardiac nerves which traverse the posterior mediastinum. One must keep in mind the presence of the thoracic duct. This structure lies on the front of the bodies of the vertebra behind the œsophagus, and holds this position until it turns forward about the level of the seventh cervical vertebra to empty into the confluence of the great veins on the left side of the neck. The œsophagus should not be disturbed. Damage may be done to the thoracic duct.

When the diverticulum is lifted up into the neck it is pulled upwards and outwards. All

adhesions can be sponged off with gauze. Several important structures will be found crossing its neck close to the œsophagus, and it is here that great damage can be done, for these structures look very much like simple adhesions. They should be treated with the utmost gentleness and not divided, for in all probability the thoracic duct is embedded in them, along with the inferior thyroid artery and some branches of the recurrent laryngeal nerve. By manipulation it will be found that the apex can be brought behind these structures. The omo-hyoid will also cross the sac, and if this muscle is well developed it may be wise to divide it, but in any event the diverticulum should be brought posteriorly to this muscle.

It must be remembered that the diverticulum consists of an outer layer of fibrous tissue and an inner layer of mucosa. Our one concern should be the prevention of sepsis, which could travel down into the posterior mediastinum and produce death in these elderly patients. It is almost fatal to get sepsis, and, therefore, in grasping the diverticulum no sharp or toothed instruments should be used.

The disposal of the diverticulum is our next concern. If it were possible to diagnose them when quite small, their inversion into the pharynx would occasion little trouble. However, by the time they present themselves most cases have well developed diverticula of various lengths. When the diverticulum is pulled up into a vertical position its orifice into the pharynx is pulled to one side, and the œsophageal orifice assumes its correct position in the midline to receive the food. The diverticulum placed in this position will not fill but will always naturally empty itself. It will also have a tendency to decrease in size when it is not subject to daily filling.

Small diverticula up to three inches in length can be dealt with most simply by suturing them as high as possible beneath the fascia of the left sterno-mastoid muscle. This should be done with a fine suture on an intestinal needle. Care must be taken that only the outer fibrous coat of the diverticulum is pierced, and if there is any doubt that this cannot be accomplished without puncturing the mucosal coat and producing a leak it should not be attempted. If this accident should occur air bubbles will be seen, and it will be necessary to bring it outside, as is done in dealing with a large diverticulum.

The apex of a large diverticulum is encircled with a silk ligature and pulled out through the upper end of the wound as far as possible. This

Fig. 1.—View of a diverticulum 12 days after operation. It originally protruded four inches from the surface but is now shrunk to a hard ball by alcohol dressings and is ready to be cut off. Note the gangrenous apex round which the silk ligature was tied.

Fig. 2.—Oblique view of a diverticulum. Note that it lies behind the aorta and great vessels. The tip approaches the level of the hilum of the lung.

wound should be closed tightly around the neck of the diverticulum but not sutured to it. The end of the silk ligature is sutured to the skin higher up. This fixes the diverticulum in the wound, and in the course of forty-eight hours this wound is sealed off by adhesions and there is no further danger of infection. Alcohol dressings are applied to the protruding diverticulum. This shrinks it to a hard round ball

which may be removed close to the surface of the skin, without anæsthesia, about the eighth to the twelfth day, depending on its size. On account of the thinness of the neck there is a very short tube of diverticulum, not over one and one-half to two inches, extending between the skin and the œsophagus. This is in an emptying position, and in the majority of cases there will be no further trouble when the fistula has healed. It is very exceptional that it is necessary to dissect the mucosa from the fibrous coat and ligate it. The risk of infecting the neck is the objection to this procedure, and simple cauterization with a pure silver nitrate crystal is usually sufficient to heal the fistula. After operation, the patient is put on a light regular diet and the convalescence is usually smooth and rapid.

This simplified manner of dealing with diverticula depends wholly upon the extreme care taken to avoid infection. The following advantages are apparent: one anæsthetic is given; only one opening of the neck is required; there is no necessity for the use of gauze packing; convalescence is short; the wound is usually healed in from 15 to 20 days.

DIAGNOSIS OF SOME MAJOR VASCULAR ACCIDENTS*

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ONLY certain pronounced clinical aspects of interest in diagnosis will be referred to in the vascular conditions selected for this presentation. Spontaneous rupture of the aorta, spontaneous subarachnoid hæmorrhage, and an observation on coronary occlusions will be considered on the basis of a group of cases in each class.

Spontaneous rupture of the aorta.—The distinctive pathological character of the lesion in 4 cases was that the rupture was complete, sudden, and that there was no pre-existing dissecting process destined to produce an aneurysm. Death was not instantaneous in every case. In a dissecting aneurysm the first stage is in reality an incomplete rupture of the wall; the final tear after the aneurysm has formed completes the perforation. The last-stated conditions are not within the meaning of spontaneous rupture of the aorta. There is always some predisposing pathological change that allows for a spontaneous rupture. A normal aorta requires a tremendous internal pressure to produce rupture of its wall, a pressure much greater than can be developed by the cardiovascular dynamics. Usually the conditions which predispose the aortic wall to dissecting aneurysms are the same as those which permit the vessel to suddenly give way in rupture.[1] Underlying factors to both spontaneous ruptures and dissecting aneurysms are either exogenous influences or indigenous changes. To the first belong trauma, tuberculous and abscess erosions; to the second, acute mycosis of the aorta, syphilis, atheroma, stress as in coarctation, and in some cases, as yet undetermined reasons.

The clinical course of one experience was observed continuously for the whole of its duration of twelve hours. The salient points are stated below. The impressions gained in this instance made it possible to suggest a diagnosis in two others before death. These were also later confirmed by autopsy examination. A fourth person was stricken under circumstances which made observations impossible and which hastened his death. This patient collapsed in the midst of an excited crowd entering a place of amusement.

CASE REPORT

A railroad overseer, 48 years old, was suddenly seized at the lunch table with an excruciating, lancinating pain between the shoulders. Within a short time the pain shifted anteriorly and localized substernally. He was seen at home within a few minutes and found in extreme agony, very restless, and covered with cold perspiration. His colour was good; pulse full; heart sounds clear. The general clinical appearance was about the same as in any severe calculus colic. Within one-half hour the pain between the shoulders recurred with such severity and such suddenness that the patient seemed to rebound as if stabbed in the back. Three-quarter grain injections of morphine were required, and at the end of the last injection the patient collapsed. The sudden pallor was extraordinary. With camphor in oil and artificial respiration consciousness returned, the heart sounds became faintly audible, and he was able to point out that the pain shifted to the left chest. Recovery continued and at the end of four

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hours it was possible to move him to the hospital. Blood pressure was 58/44; white blood count 25,500; pulse rate 124; temperature subnormal; urinalysis normal. Electrocardiographic changes supporting a tentative diagnosis of coronary occlusion appeared as early as five hours from the onset. At the tenth hour Cheyne-Stokes respiration developed, the pulse failed, but with artificial stimulation it was repeatedly recovered at will. The most remarkable feature was the apparent bloodlessness of the man. He died at the end of twelve hours. The working diagnosis of an acute coronary occlusion with too rapid sequence of events leading to hæmopericardium was felt to be unsatisfactory all along. There was no known previous cardiac disability and the only illness was twenty-five years ago when he required eleven months of hospitalization for multiple pyæmic abscesses. The post-mortem findings were; rupture of the ascending aorta, hæmopericardium, hæmorrhage extending along the arch and great vessels, and free blood in the left pleural cavity.

In the three of the four cases that could be observed for a sufficient enough time before death occurred the striking feature was a lancinating obstinate interscapular pain. On the strength of this phenomenon and the physical appearance suggesting occult bleeding a diagnosis of ruptured aorta was made in two other cases. The location of the referred pain in the upper and posterior thoracic region is consistent with the segmental distribution of the nerve supply to the aorta. We only need to recall in this connection the principle of posterior root ganglion injections for desensitizing coronary and aortic reflexes in the treatment of angina pectoris.[2] Spontaneous rupture before the age of forty is not uncommon. Where aneurysm does not exist the diagnosis is seldom considered. There was no previous aneurysm in any of the above cases. In all cases perforation took place about the site of an atheromatous plaque. It is possible to make the following deductions. Obstinate severe lancinating interscapular pain might serve as a reminder of spontaneous rupture of the aorta in the differential diagnosis in cases of cardiac collapse, especially where colour changes suggest invisible bleeding. If this holds true in a greater number of cases it will be possible to make the ante-mortem diagnosis more often. Since the first stage of a dissecting process is the same problem only aborted, a more exact description of the pain in an attack simulating a coronary accident may reveal an alternative possibility, that is, the first stage in a beginning dissecting aneurysmal formation and not an acute coronary occlusion. So far we have not found atheromatous changes with gradual elongation and widening of the arch of this great vessel to be the cause of the more chronic interscapular pains that are so frequently complained of. It is probably not to be expected that pain will arise until the adventitia is under more severe tension. This pain phenomenon and bloodlessness was regarded as pathognomonic of spontaneous ruptures in our cases. In reviewing available literature only casual reference to pain is found, and only once it is mentioned that its most common radiation is into the mid-dorsal spine.[3] This we confirm, emphasize, and add, that when it is concomitant with signs of exsanguination it is typical of the condition.

Spontaneous subarachnoid hæmorrhage.—The diagnosis of subarachnoid hæmorrhage is possibly made less often than the actual incidence in practice. There can be no statistical index of the actual incidence, but judging from unexpected discoveries this seems true. Some other comparisons are possible. One report on hospital admissions showed cerebral vascular accidents of all types, 353 cases; spontaneous subarachnoid hæmorrhages, 24;[4] that is one in every fifteen of all cerebrovascular accidents. Symonds[5] points out that blood in the subarachnoid space may arise from one of the following four sources: (1) a subdural hæmorrhage from laceration of one of the dural veins with rupture into the subarachnoid space; (2) a hæmorrhage in a superficial part of the brain with rupture through the pia and into the subarachnoid space, cerebromeningeal hæmorrhage; (3) a deep cortical hæmorrhage with rupture into a ventricle and extension through the foramina of Luschka and Magendie into the subarachnoid space; (4) a rupture of one of the vessels lying in the subarachnoid space. Group 4 is the primary subarachnoid group. All groups may present the typical picture of spontaneous subarachnoid hæmorrhage with few or no signs of gross cerebral involvement. Opinion is equally divided between congenital miliary aneurysms and atheromatous changes as causes of spontaneous subarachnoid hæmorrhages. Frequently the exact cause is unrecognized and the site of origin of the bleeding is not located.

The usual signs and symptoms in spontaneous subarachnoid hæmorrhage in a typical case are now recognized as one of the few classic syndromes in medicine. The onset is dramatic, with sudden severe headache as if the patient

had been struck on the head; vomiting, dizziness and then coma usually supervene. Various other less constant features also occur, but signs of mild meningeal irritation are nearly always present. The spinal fluid examination is characteristic of the condition. So that, for the most part, the history suggests the diagnosis and the cerebrospinal fluid test confirms it. The pitfalls in so clear-cut a clinical entity would be few if all the data were always available. The diagnosis has often to be made some time after the initial phase. Then the emphasis which the patient or friends place on the after-effects, even at the expense of neglecting to mention the mode of onset, obscures the picture. Or, the memory of that incident may be lost until resurrected by close inquiry and by carefully retracing the events. Certain predominating features at the time of examination are misleading. It is in this respect that our 11 cases will be referred to and extracted briefly.

CASE 1

An elderly woman was admitted to the hospital with extensive ecchymosis around both eyes. The only neurological sign present was an extensor left plantar reflex response. She did not associate a recent severe frontal headache, vomiting and dizziness with this subsequent development. The spinal fluid was xanthochromic. A fatal recurrence of hæmorrhage occurred and post-mortem findings showed an extensive hæmorrhage into the subarachnoid space.

CASE 2

A hypertensive man, stated to have had an exactly similar experience three years ago as at the present. While walking something suddenly snapped at the back of his head, which induced vomiting and dizziness, but he was able to continue with his walk home. Rigidity of the neck, slight bilateral papill-œdema, a temperature of 101° were now present, and a diagnostic tap showed bloody spinal fluid. He recovered and lived six months until another and fatal recurrence.

CASE 3

A female, 36 years of age, came for observation because she continued to have photophobia a week after a severe pain in the back of her head and a spell of vomiting. Bilateral papillœdema was present, a positive Kernig's sign, and blood-stained spinal fluid.

CASE 4

A male, 47 years old, also had photophobia for four days following a sudden headache. A second attack with unconsciousness for an hour brought him into hospital. Scattered fresh retinal hæmorhages and slight œdema of the nasal portions of both disks and typical bloody spinal fluid were found. He died later of another hæmorrhage which produced a sudden complete hemiplegia.

CASE 5

Following teeth extraction another man suffered a transient loss of consciousness three months previously with weakness in the left side of his body and severe headaches. The spinal fluid was normal. A week later complete paralysis of the opposite side occurred and death was rapid. Autopsy findings were pachymeningitis hæmorrhagica with a succession of bleeding into the same site.

CASE 6

A woman of 52 years lost consciousness after a severe headache and completely recovered without residual signs. The incident could ordinarily be passed, but a routine lumbar test was made which was typical of subarachnoid hæmorrhage.

CASE 7

A man of 46 years suffered a severe pain in the back of the head and fell convulsed. He was unconscious twenty-four hours. On admission meningeal signs were present and bloody spinal fluid.

CASE 8

A woman was in the hospital a whole week because of listlessness. Her physician admitted her as a precautionary measure because she had suffered momentary unconsciousness and was dizzy and drowsy. The first spinal fluid taken a week later was still bloody. Repeated drainages were made and she recovered.

CASE 9

An elderly woman developed a right-sided hemiplegia, which in itself is a common enough occurrence but it came on with a severe headache, and all the other typical signs of subarachnoid hæmorrhage were also present, including glycosuria.

CASE 10

A young woman of 21 years developed a hemiplegia, which on account of her age and some suspicions about her heart was regarded by her physician as embolic in origin. An onset with headache and vomiting was later ascertained. She had glycosuria and the meningeal symptoms were suspicious. The spinal fluid was xanthochromic. Recovery was complete.

CASE 11

In the course of recovery after repeated transfusions a man with thrombocytopenic purpura developed coma suddenly which post-mortem examination proved to be the result of an extensive subarachnoid hæmorrhage.

Some further practical points which arise in connection with the problem are as follows. Spontaneous subarachnoid hæmorrhages are not always single events in a lifetime. Many patients recover and recurrences in the same case happen. Of my 11 cases 6 died and 5 recovered. In the 6 deaths 4 had had previous attacks and 2 died as a result of the first attack. The history, therefore, of a suggestive preceding incident should serve as a suspicion. The rôle that this type of hæmorrhage plays in all forms of coma combined is a very important one. In the hemiplegias so commonly taken for granted, but where headache is a prominent feature, subarachnoid hæmorrhage may be the underlying cause. In that case if the crisis is survived the prognosis for complete recovery is much better, and paralysis practically nil. Misleading signs may be photophobia, ecchymosis, glycosuria, cervical pains, transient unconsciousness. Sin-

gular neurological signs such as point to some meningeal irritation or a positive Babinski test, papillœdema and retinal hæmorrhages which seem disconnected, actually prove very important findings when a history is later obtained by further questioning regarding the mode of onset, and a possible clue to the diagnosis is obtained. Wherever there is any suspicion at all this is sufficient excuse for a diagnostic lumbar puncture. The diagnostic tap has not aggravated any of our cases. Repeated spinal drainage as a therapeutic measure is an arbitrary procedure. Certainly where there is increased pressure drainage is indicated. Sprong[6] states that from experimental evidence the rate at which blood-bearing spinal fluid can be withdrawn from the subarachnoid space necessarily is limited to the rate of secretion of fresh fluid. This is far too slow to rival the rapid spontaneous elimination of red cells, so that only a negligible fraction of subarachnoid blood can be removed by repeated withdrawal of spinal fluid by the time fluid clearance takes place. In the traumatic case he states lumbar punctures should be used for diagnosis and reducing abnormal pressure but they are entirely futile as a means of hastening the disappearance of blood from the cerebrospinal fluid. On the whole the same principle holds true in the non-traumatic form. For the relief of meningeal symptoms lumbar puncture should be repeated.

Since the type of cerebrospinal fluid is such a reliable proof some of the following conditions should be recalled. Froin (quoted by Cookson[7]) in 1904 pointed out that the three diagnostic criteria are uniform admixture with blood, failure to clot on standing, and coloration of the fluid remaining when the red cells have sunk to the bottom of the tube. In some cases the fluid does not necessarily appear tinted with blood to the naked eye. The concentration of red cells may be so low that the fluid is perfectly clear and they are only discovered on microscopy. Russel[8] states that there is no doubt that the blood clots normally enough at the site of hæmorrhage, but one must imagine by the time it has permeated down through the interstices of the subarachnoid space to reach the lumbar cord it has become defibrinated. Two or three separate samples drawn off should be compared to exclude the possibility of accidental blood.

Coronary occlusion.—Left-chest pains parallel right lower-quadrant abdominal pain in that the differential diagnosis must yet be made. Pain is only a sign. The former is not synonymous with cardialgia any more than the latter is with appendicitis. Angina pectoris is literally "breast pains". It is convenient and proving reliable for bedside guidance to incorporate the whole gamut of thoracic pains in four distinct groups. To the first and most malignant form belong the acute coronary occlusive processes. The Heberden type, or angina vera, is the second variety and is an old established clinical entity attributable to coronary defects. Then angina pains arise out of various cardiac deficiencies which are not in the category of either of the above, and the terms of atypical or pseudo-angina only allow for an uncertainty which the diagnosis implies. There are simple anginas also induced by ischæmia but not directly coronary in origin. They are the result of an unhealthy state of the myocardium, a toxic substance, or anoxæmia in extreme anæmia. Lastly conditions simulating cardiac pains, but in which the production mechanism does not involve the cardiac neuromuscular pathway, are common, as in dorsal spinal arthritis or intercostal neuralgia. As an aid in diagnosis corresponding clinical symbols are fairly typical. The angina maligna group is clinically characterized by extreme restlessness while the angina vera type comes to a standstill with the attack. With angina simplex the pain is in the form of a præcordial oppression and the counterpart is fatigue or asthenia. In angina similans the superficial hyperæsthesia and inframammary location of the pain is distinctive. Coronary disease is not always a source of trouble to every afflicted individual as post-mortem examinations often show. Rarely grave coronary accidents produce other catastrophic signals in place of pain.[9]

The typical coronary occlusion accident is diagnosed without difficulty. The severity, persistence and the location of pain is characteristic. The patient reacts by shock, restlessness, leucocytosis, fever, local pericardial exudate formation, and distinctive electrocardiographic changes. The blood sedimentation rate also drops. Such events do not recur in the same individual even once again in 50 per cent of all cases, as nearly that many die in the first attack. After recovery, the patient rarely escapes one

of two sequelæ. Either signs of myocardial failure develop or he remains subject to attacks of true angina in variable degrees of severity. In true angina effort or emotion produces a typical acute attack requiring "standstill", often a feeling of impending dissolution, the usual radiation of pain; response to nitroglycerin is with benefit, and the pain is not supposed to have a duration of longer than about one-half hour. It becomes very important to know whether actual occlusion of a coronary vessel has occurred or not. Though both latter types of angina are very serious the distinction is still important. The weight of the difference between the two is equal to the comparative value of a localized impoverished myocardium in the one case as against a complete infarct in the other. Oftentimes the first attack in a true angina is sudden and extremely alarming. If all the data are not available, or were not obtained at the time of the attack, it becomes a matter of speculation later as to whether an occlusion had occurred. Even immediately after an acute anginal attack some doubt may remain. We have come to rely a great deal on an observation where the individual is an habitual smoker (more than two-thirds in our series smoked). After a sudden acute attack of substernal pain, and in general when the clinical course is that of a coronary occlusion the individual finds that he has not smoked or had any desire and even lost the taste for smoking. He resumes this habit as cautiously as he permits himself to exercise. If an individual has had this experience and in other ways the course remains questionable of occlusion this sign is of value when positive. It is equally of value when the patient who smokes has definitely not had this experience. In 23 cases 16 smoked and gave this positive sign; 7 were non-smokers; 8 others died suddenly before this information was available. The inference from the effect of tobacco suggests the question of the incidence of Buerger's thrombo-angiitis obliterans in coronary artery disease. On a percentage basis alone this element is obviously excluded. This phenomenon was dealt with more fully elsewhere.[10] While it may have some biochemical relation to the so-called smoker's angina it is altogether a different and distinctive clinical feature.

SUMMARY

Severe obstinate lancinating interscapular pain was the leading sign in three patients who did not die immediately, out of the four who had spontaneous rupture of the aorta. In these an ante-mortem diagnosis was possible. Where attendant indications of occult bleeding accompany this pain, the combination is practically diagnostic of the condition.

Ordinarily the clinical signs associated with spontaneous subarachnoid hæmorrhage are typical. Difficulties arise when patients are seen some time after the initial stage. Then irregular presenting features are misleading. These were encountered; ecchymosis about the eyes, photophobia, transient unconsciousness, glycosuria, cervical pains and isolated seemingly unrelated neurological signs. The incidence of this condition is more common than generally expected. Recovery in the majority, and repeated hæmorrhage in the same person, is the rule.

The anginal syndrome is divided into four types on the basis of a corresponding clinical and pathological conception. This is proving a reliable plan, and brings order out of our confusion with which we approach this dreaded set of symptoms. A further aid in the differentiation between only two of the four types is noted in those who smoke. When an occlusive process developed it is observed that there is a loss of taste for tobacco, and the smoker automatically breaks with the habit, either permanently or until he is well on to recovery.

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SOME COMPLICATIONS FOLLOWING ABDOMINAL OPERATIONS*

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The "burst abdomen". — This unfortunate complication, known by many names, is always serious and often fatal. It occurs on an average in 2 per cent of all laparotomies and has a mortality of 30 to 35 per cent. While evisceration may follow any type of abdominal operation it is more likely to occur where there is fluid in the abdomen in association with tuberculosis or malignant growths. Mild infection, as from operations on the stomach or intestine, is also a predisposing factor. Gaseous distension, as pointed out by Glasser, is probably the most essential cause. Vomiting and coughing are contributing factors. The only incisions that seem to be exempt from "bursting" are the McBurney, or so-called "gridiron" incision, and the Pfannenstiel. A transverse or oblique, such as the Kocher gall-bladder incision, is much less apt to open than a vertical, and a paramedian less than a midline.

Since using doubled figure-of-eight reinforcing silk worm gut stitches in all laparotomies for the past twenty years no case of evisceration has occurred in my practice, though even with this added precaution the stitches have in three instances cut through the tissues, exposing the viscera beneath. These reinforcing stitches are left *in situ* fourteen days. Should evisceration occur, resuturing with figure-of-eight doubled silk worm gut stitches through all the layers except the peritoneum is in my opinion better than attempting layer suturing, the layers having by this time become fused together (Fig. 1). In slight spreading of the wound adhesive strapping, efficiently applied, may suffice.

Hæmorrhage.—Immediate hæmorrhage is due either to failure to ligate a bleeding point or to the slipping of a ligature after the abdomen is closed. Delayed or reactionary hæmorrhage is due to the rising blood pressure, depressed by the shock of the operation or by the anæsthetic. In this connection one must bear in mind the fall in blood pressure that often accompanies the use of spinal anæsthesia.

In the treatment of post-operative hæmorrhage it is most difficult to decide whether to depend upon medical measures or immediately to reopen the abdomen and search for the bleeding point. The age and general condition of the patient, the amount of blood lost, the accessibility of the bleeding point, and the possibility that it can be located are all factors that aid in arriving at a decision. One would not hesitate to reopen the abdomen in early hæmorrhage following an appendectomy or cholecystectomy where the bleeding vessel would be almost certainly located with a minimum of exploration. On the other

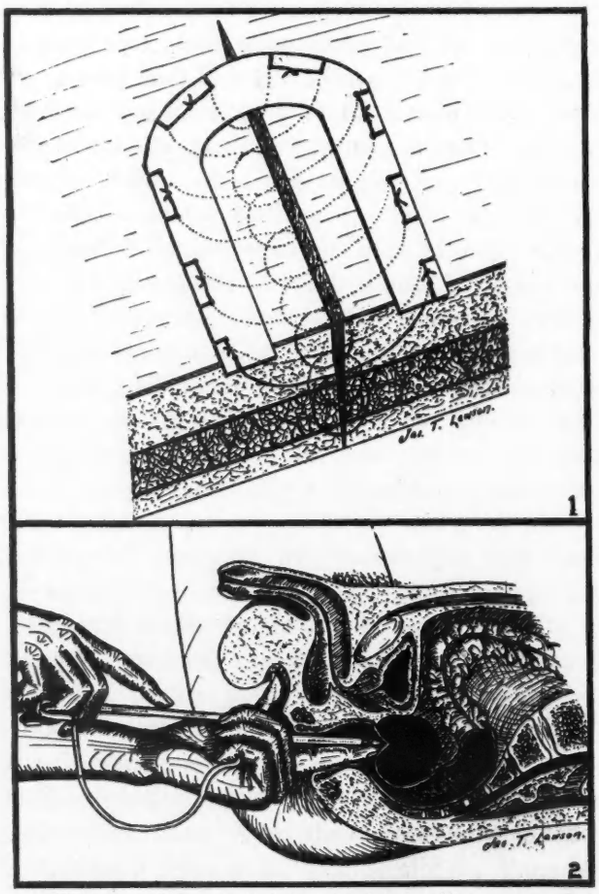

Fig. 1.—Figure-of-eight doubled silk worm gut sutures through all layers except the peritoneum and tied to a Wetherbee plate.

Fig. 2.—Puncturing an abscess in the recto-vesical pouch. A drainage tube may be advantageously inserted but is seldom required.

* A paper read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Section of Surgery, at Ottawa, June 24, 1937.

hand, one would be loath to open the abdomen after a gastro-enterostomy or a gastric resection. The probable size of the vessel, as indicated by the rapidity with which the symptoms of hæmorrhage increase, will also weigh heavily in the ultimate decision. That is, if the vessel is a large one, such as the left gastric (coronary) or splenic, death will most likely occur before any treatment can be carried out. If the vessel is intermediate in size the patient is so rapidly exsanguinated that nothing more than medical treatment can for the time be considered. Should this be successful in tiding the patient over the crisis no surgical intervention is required. Great care must be exercised not to raise the blood pressure by stimulation or transfusions until such time as the coagulum in the blood vessels has become sufficiently organized not to be dislodged. Bleeding from smaller vessels results in less rapid decline in the patient's general condition, and, therefore, permits of observation and a choice between conservatism and surgical intervention. The wound should be reopened if hæmorrhage persists in spite of medical treatment.

It is a well recognized fact that jaundiced patients run a very great risk of post-operative hæmorrhage. Jaundice produces some change in the chemistry of the blood which is not definitely understood. This change in some way interferes with the arrest of bleeding. The bleeding and clotting time may be normal, and yet the patient may bleed to death within twenty-four or forty-eight hours after the operation.

In a recent case deeply jaundiced from malignant obstruction of the common bile duct I did an external drainage. The icterus index at the time was 192, but during the operation the bleeding was not more than normal. The patient had been given viosterol as a prophylactic measure. Two months later as a result of drainage the icterus index was 10 and the patient had gained 11 pounds in weight. I again operated to remove the obstruction. This was found to be impossible and a cholecysto-duodenostomy was done. Bleeding this time was more troublesome. Viosterol had not been given since the first operation. All went well until the eighth day after operation when bleeding from the wound began. The wound was partly opened and packed with adrenalin-soaked gauze. Bleeding persisted and the wound was re-packed with gauze saturated with adrenalin and Tr. Ferri Perchloridi. Her blood pressure being 82/42 and pulse almost imperceptible, feet and hands cold, a transfusion was given, but the oozing still continued. A dose 4/10 of a c.c. of moccasin snake venom was given. Following this, bleeding practically ceased. A second dose was given in 12 hours and a third 24 hours later. Intravenous saline and glucose were administered, care being taken not to raise the blood pressure too rapidly, and the patient, two days previously almost moribund, was back to her former reasonably good post-operative condition. Does it not seem more than a coincidence that the bleeding should have ceased after the first administration of the snake venom?

Secondary hæmorrhage occurs when a vessel gives way as result of infection and is usually seen a week or so after operation. It is a rare occurrence following abdominal operations. The treatment on account of the infection is necessarily medical, unless the infection itself requires surgical intervention. It is obvious that the best treatment of post-operative hæmorrhage is prevention, and time spent in the careful tying of blood vessels, no matter how small, is never wasted.

Post-operative peritonitis. — Post-operative peritonitis should always be preventable in a clean laparotomy. Where infection is already present a minimum of manipulation and a maximum of respect for existing barriers will reduce to the lowest possible level the risk of spreading infection. Judicious selection of the optimum time for operation in late cases of appendicitis, cholecystitis, etc., will further lower the incidence of peritonitis. Pre-operative vaccination of the peritoneal cavity has proved to be of definite value in the prevention of peritonitis following colon and rectal operations. The usual treatment after any abdominal operation, namely, morphine to relieve pain and ensure rest, gastric suction for persistent nausea and vomiting, normal saline solution and glucose intravenously, is, fortunately, the treatment of peritonitis in its earliest stage. The Fowler position should be used in every case of suspected peritoneal infection. The abdomen should not be reopened unless there is positive evidence of leakage of infective material into the peritoneal cavity. Gastric suction must be continued till the return

becomes clear. The patient must drink water freely and when the return is clear the tube should be clamped for variable periods. A sign of improvement is when intake exceeds output. Maintain the water, food, and chloride balance with (*a*) normal saline by hypodermoclysis and proctoclysis; (*b*) normal saline with 5 per cent glucose given intravenously (2,000 to 4,000 c.c. every twenty-four hours). After the third day endeavour to move the bowels by large enemas, aided by pitressin. If the enema is not expelled it should be siphoned off. This should be repeated several times in twenty-four hours. My experience with pitressin is too limited to make any dogmatic statement, but on theoretical grounds and some experience it appears to be beneficial. By maintaining the tone of the musculature of the small bowel without at the same time causing active peristalsis accumulation of toxic material is lessened. Should regurgitation persist and enemata prove ineffectual a jejunostomy should be done and the bowel irrigated through the tube with saline solution. Should a localized abscess (subphrenic, subhepatic, or pelvic) develop it must be drained. A large collection in the pelvis rising above the symphysis may be drained through a suprapubic incision. A smaller collection in the cul-de-sac can be most satisfactorily drained per rectum (Fig. 2). At the earliest possible moment the offending organism should be identified and appropriate treatment given. If streptococci predominate the picture para-amino-benzene-sulphonamide should be given; if the *Cl. Welchii,* the appropriate serum is administered. We, as surgeons, welcome these adjuvants in the treatment of peritonitis.

Acute post-operative intestinal obstruction.—Acute intestinal obstruction occurring during the late post-operative period offers no special problem other than that of intestinal obstruction generally and needs no discussion here. Acute intestinal obstruction developing soon after a laparotomy, however, presents two difficult problems, namely, one of diagnosis, and one of operative procedure. As the cause of post-operative obstruction is in nearly all cases adhesive peritonitis and kinking there is usually an interval after the operation when the patient's bowels have functioned. Then vague crampy pains, similar to the gas pains from which the patient has so recently recovered, return. Enemas that had proved effectual now produce no result. Vomiting which was controlled has returned. If the patient is still receiving sedatives and hynotics for post-operative pain the symptoms may be so obscure and vague that the surgeon is loath to diagnose so serious a complication as intestinal obstruction, thus resulting in serious delay.

Immediate laparotomy, the rule in early acute intestinal obstruction, seldom applies in acute post-operative obstruction. No matter how early the diagnosis is made the question of operative procedure arises. The patient is recovering from a major abdominal operation and an exploratory laparotomy superadded for adhesions with distended loops of small bowel is often time-consuming and difficult. A fundamental principle of emergent surgery is that expedient, with the minimum of risk, which will tide the patient over the immediate catastrophe. In this particular situation should gastric suction fail to relieve a jejunostomy, with very few exceptions, is the operation of choice. The resulting decompression sometimes allows the intestine to right itself and operation to relieve the obstructing cause may become unnecessary. In some of my cases an enterostomy was all that was done. However, should a residuary obstruction persist when the jejunostomy has had time to function it can then be more safely dealt with. In opening the abdomen for acute intestinal obstruction the surgeon should always have at hand a long rubber tube or, better, a straight glass tube, as advocated by the late Lord Moynihan, for emptying the distended small bowel of its toxic contents. If distension has been relieved by the jejunostomy this procedure may not be called for. It is understood that such well known measures as gastric suction, intravenous salines, and glucose, etc., have been carried out.

Post-operative acute pancreatitis.—This is a rare condition which may follow upper abdominal operations, especially on the biliary tract. It may, however, be a sequel of pelvic operations, especially if a diseased gall bladder has been palpated during the course of such procedures. The onset is usually within a few days of the laparotomy, but in one common-duct case it followed removal of a T-tube some six weeks after operation.

The diagnosis of acute pancreatitis is difficult, especially if this begins in the early post-

operative period. Acute peritonitis, intestinal obstruction, dilatation of the stomach, acute ventricular failure, and even delayed shock have been diagnosed. The clinical picture presented by the patient may simulate very closely any of these entities. Sudden profound collapse, with marked fall of blood pressure, tachycardia, and cold moist extremities have been the outstanding features in two of our cases. Repeated copious vomiting in another case suggested acute dilatation of the stomach, and when the patient failed to respond to the standard treatment for this condition we feared we were dealing with high intestinal obstruction. Marked generalized abdominal distension in this and another case further suggested the diagnosis of acute intestinal obstruction. The agonizing pain usually ascribed to acute pancreatitis is often missing, or perhaps masked by the post-operative distress already present and by narcotics used to relieve pain.

A jejunostomy was done in one of our cases, the diagnosis being intestinal obstruction. This gave definite relief for a time, though the patient finally succumbed. The post-mortem showed complete gangrene of the pancreas. If the diagnosis of hæmorrhagic or gangrenous pancreatitis can be made with a degree of certainty a retro-peritoneal approach, established by an incision made in the left flank, is indicated, the gangrenous material being scooped out with the hand and a large drainage tube inserted. From conditions seen at post-mortem this seems a logical treatment in acute gangrenous pancreatitis, and may save a percentage by an incision made in the left flank, is in- of these otherwise fatal cases. This step should only be considered when the patient has fully recovered from the initial shock and is in a condition to withstand a further formidable operation.

THE VALUE OF MAPHARSEN IN THE TREATMENT OF CONGENITAL SYPHILIS*

By EDWARD A. MORGAN

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THE arsenical compound, meta-amino-para-hydroxy-phenylarsine oxide, commonly called "mapharsen", is not a recent discovery. It was evolved by Ehrlich and his associates, and recognized by them as a powerful spirochæticide but discarded because of its toxicity. It is believed to be the active principal of salvarsan, being produced from the latter *in vitro* by simple oxidation. It is probable that after an intravenous injection of salvarsan the drug is oxidized in the body and the mapharsen formed is the only fraction of the original compound possessing any bactericidal action. The remaining chemical compounds formed, particularly arseno-oxide, are thought to be responsible for the severe, immediate or nitritoid reactions which occur in some cases. Whether this is the true explanation of these reactions is still a question, but it is certainly true that a typical nitritoid reaction is rarely if ever seen after an intravenous injection of mapharsan.

In the last few years interest in the drug has been revived by positive evidence of its value as a spirochæticide in experimental diseases such as trypanasomiasis, and more recently favourable reports have appeared in the literature following its use in the treatment of acquired syphilis of adults and of Vincent's angina. The consensus is that the drug is easy of administration, its use is not attended by any serious reactions, and the clinical manifestations of syphilis disappear quickly. As to its ability to reverse the Wassermann reaction opinions are somewhat divided.

To fix by clinical observation the value of one arsenical as compared to another is not easy. By the "value" of the drug I am referring only to its effect on the Wassermann reaction. I am convinced that a true estimate cannot be made in congenital syphilis at any rate unless the drug is used for a minimum

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of five years. The age of the patients, the degree of regularity of treatments, and the employment of other medication used in conjunction with the arsenical compound, all tend to increase the difficulty. In the clinic at the Hospital for Sick Children the same routine of treatment has been employed for eighteen years. This is briefly: one intravenous injection of an arsenical compound, once a week for six weeks; mercury by inunction and mouth for six weeks, followed by a Wassermann test. This constitutes one course of treatment, and is repeated over and over again without rest periods. If, then, a new arsenical is introduced in a series of cases some estimate of its value may be obtained by comparison with a similar group of cases in previous years, since the only difference in the type of treatment is the variety of arsenical compound used. An accurate comparison on this basis was, however, not so easy as it sounded, due to the fact that many of our mapharsen patients had received previous treatment by other arsenicals for periods varying from one to five years.

In all, 72 children were given mapharsen treatment but in 32 of these the injections were discontinued because of reactions. These reactions, as will be shown later, were found to be due to inaccurate dosage rather than to any fault of the drug, and when later a proper standard for treatment was adhered to many of these patients were placed again on the list, but up to the time of writing this report they had not received sufficient treatment to warrant including them in the statistics.

THE RESULTS OF TREATMENT

The remaining 40 children were, with one exception, over 5 years of age, and were thus in the so-called late stage of congenital syphilis. One infant treated at four months of age became Wassermann-negative in five months. This is two and one-half months earlier than the average time required when using other arsenical compounds, and which was established by a statistical study of this clinic covering a period of 12 years.[1] In 8, or 20 per cent, of the remaining 39 the Wassermann reaction was reversed from 4 plus to negative in an average period of treatment of ten months. In 15, or 38 per cent, the Wassermann test was changed from 4 plus to 3 plus, 2 plus or 1 plus, in an average time of 14 months.

In the last statistical study of the clinic[1] it was found that of the group in the late stage 49 per cent were cured and 20 per cent improved. It must be remembered, however, that in this study the patients had been under continuous treatment for periods up to as long as twelve years, and the time factor as well as the persistent treatment was responsible for the number of negative Wassermann reactions. In the present series of cases, using mapharsen, no child has been treated for more than 16 months, and I feel that the figures 20 per cent cured and 38 per cent improved constitute an excellent showing for the drug. With continuation of the use of the compound for a further period of three to four years, a more reliable and accurate estimate of its value will be possible. In Table I the comparative figures for the three treatment periods are shown more clearly.

TABLE I.

	Number of cases in late stage	*Percentage cured*	*Percentage improved*	*Percentage unimproved*	*Time required for negative Wassermann*
Summary, 12 years after clinic started	162	49.0	20.0	31.0	28 months
Summary, 4 years after clinic started	66	24.2	24.2	51.6	16.5 months
Mapharsen series, treated only 16 mos.	39	20.0	38.0	42.0	10 months

REACTIONS

It is important when treating children to select a drug which causes as little systemic reaction as possible. An adult will suffer without complaining distressing reactions during his course of treatment, but the same adult will refuse to bring his child to be subjected to the same unpleasant effects. The number and severity of reactions were therefore carefully noted during the use of mapharsan.

In all, 935 intravenous injections were given and 133 of these were attended by some reaction. In only one of the 133 was there an immediate reaction, and this was not of the true nitritoid variety, there being no suffusion of the superficial capillaries and no feeling of

suffocation. One child developed a slight degree of jaundice which cleared in three weeks. All the other reactions were mild, occurred about one and a half hours after injection and consisted of nausea, vomiting and slight headache, lasting one to two hours. Twenty of the children suffered no reaction even in doses as high as 1 to 1.25 mg. per kilo. Four of the 32 patients in whom the treatment was discontinued proved unusually susceptible, suffering reactions with dosages as low as 0.3 mg. per kilo.

THE STANDARD OF DOSAGE

Reactions were more frequent during the first few months the drug was in use. This was due to the tendency to give too large doses —a tendency developed during the employment of novarsan, which is extremely well tolerated by children in large doses. Experimentation with the patients who reacted, in an endeavour to find the safe maximum dose, led naturally to the establishment of the dose per kilo. of body weight which could be used as a standard for the treatment of children. The standard dosage recommended by the manufacturers is 0.5 mg. per kilo. An analysis of all injections given in the clinic showed that patients were treated using standards varying from 0.3 mg. to 1.5 mg. per kilo.

TABLE II.

Mg. per kilo of body weight	*0.4*	*0.45*	*0.5*	*0.55*	*0.6*	*0.7*	*0.75*	*0.8*	*0.9*	*1*	*1.2*
Total number of doses.	53	78	95	112	226	111	35	68	30	41	86
Number giving reaction.	8	11	2	7	11	8	2	22	13	15	34
Percentage giving reaction.	14.5	11.6	2.1	3.6	5	7.2	6	32.2	43	37	40

The number of injections given according to the various standards is shown in Table II, with the percentage giving reactions in each group.

The moderately high percentage of reactions seen in the first and second columns is probably due to repeated attempts to treat three or four unusually susceptible children. The sudden increase in the percentage of reactions in the column, 0.8 mg. per kilo., is striking and informative. Apparently the ideal standard is from 0.5 mg. to 0.75 mg. per kilo., with an average of 0.6 mg. I would recommend that each new case be started at 0.6 mg. per kilo. and increased fairly quickly to 0.75 mg. After that any increase must be gradual until the tolerance of each patient can be ascertained. Since the drug is not completely eliminated from the body under six days it is unwise and unnecessary to administer more than one dose a week.

CONCLUSIONS

The use of mapharsen in the treatment of congenital syphilis has much to recommend it. The drug is safe and easy to administer. Reactions following its use are mild in character and can be almost completely eliminated by care in adjusting the dose. An analysis of 40 cases treated over a period of 16 months strongly suggests that the drug is a more powerful agent in effecting a serological cure than any other arsenical compound previously used in the clinic.

The clinic proffers its sincere thanks to Parke-Davis & Co., who kindly supplied the mapharsen used in the experiments.

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HÆMOLYTIC STREPTOCOCCUS MENINGITIS: REPORT OF CASE WITH RECOVERY AFTER USE OF PRONTOSIL AND SULFANILAMIDE.—The case of hæmolytic streptococcus meningitis, treated with prontosil and sulphanilamide, that E. D. Anderson cites makes a total of 76 cases with recovery reported in the literature in the last thirty-seven years. In 73 of these cases the treatment consisted of repeated spinal punctures, spinal washings, injections of antistreptococcus serum, blood transfusions or a combination of these methods. There were two cases of particular interest reported in 1936. They offer two new methods of treatment. Walker and King reported a case in which streptococcic meningitis developed after an induced abortion in which both blood and spinal fluid cultures gave a positive growth of hæmolytic streptococci. Transfusions were given daily for ten days with blood taken from donors who had previously had scarlet fever. The patient made an uneventful and fairly rapid recovery. Caussé, Loiseau and Gisselbrecht made the first report in the literature of a case of hæmolytic streptococcus meningitis with recovery after treatment with prontosil. The consensus of all the authors seems to be that prontosil is of value in the treatment of hæmolytic streptococcus infection but apparently has little or no effect on other strains of streptococci or other organisms. Although at first it was thought that the drug should be given intravenously as well as by mouth, it is now generally considered unnecessary to use the intravenous method and it is given intramuscularly and by mouth.—*J. Am. M. Ass.*, 1937, **108**: 1591.

DISTURBANCES OF THE SEBACEOUS GLANDS*

BY W. R. JAFFREY

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THE sebaceous glands are racemose in form and furnish a consistent fatty secretion to anoint the skin and hairs. There are three types—those which are appendages of the hair and its follicle, those which are associated with the lanugo hairs and open directly upon the cutaneous surface, and those which are unassociated with other structures and open directly on the skin surface or glands of the mucous orifices, including the glandulæ odoriferæ of the genitalia. They are halocrine glands and the secretion of fatty material which originates in the cuboidal cells lining the acini is exuded from these cells as they are pushed out of the duct. The amount of oily material that is excreted is a personal characteristic, probably hereditary and the control seems to lie in the endocrine chain balance. It has been suggested that the same substance which stimulates the skin glands in pregnancy, especially the mammary gland, also stimulates the sebaceous glands of the fetus, and the vernix caseosa is the result of this. After birth this stimulus is absent, and during infancy the sebaceous glands are inactive, excepting in rare instances and at most up to five years of age, when we do see scalp seborrhœa in infants. The tendency reappears at puberty and also some senile disturbances manifest reactivity of the sebaceous glands. Mammary gland activity may produce an internal secretion which throws off the balance of sebaceous secretion, and the suggestion that dairy products in the diet as milk, cream, butter and cheese may have some bearing on acne may be well founded on the animal endocrines present from mammary gland activity causing overactivity of sebaceous secretion.

Apart from new growths the most diverse disturbances are seen in asteatosis or xerosis, with deficiency of sebaceous secretion, in xeroderma, where the glands are almost absent, and in seborrhœa oleosa, where the glands are plentiful and hyperactive.

Seborrhœa oleosa.—This condition is evidenced by excessive oil secretion and some hypertrophy of the gland itself, and no inflammation. It produces an oily skin from which droplets of sebum and plugs of inspissated sebum can be easily expressed; the hair is oily and there is a tendency to baldness due to the oily layer which dries and coats the scalp and plugs the hair follicles.

Seborrhœa sicca, pityriasis simplex, or *dandruff,* produces on the scalp a fine, branny, slightly greasy, white or greyish scale which falls over the body when the hair is brushed. The scales may be adherent to the scalp or laminated. The hairs become dry and lustreless due to the manner in which the oil dries into scales instead of acting normally as a lubricant. The scalp beneath the dried scales or crusts is of a lustreless, slate-grey colour, and the condition may spread to involve the face, neck, ears, eyebrows, chest, pubes, etc., with some inflammation on these areas. The hair follicles show some atrophy and little if any inflammatory evidences.

Seborrhœic dermatitis.—This condition arises from a seborrhœa on which inflammation is implanted, and the microscopic picture is very much like psoriasis, but the pegs are flatter and the infiltrate is more lymphocytic. The cause is an infective one, the organism known by the designations of various investigators as the spore of Malassez, Unna's bottle bacillus, *Pityrosporum ovale,* etc., finding its proper medium in the seborrhœal secretion and an enzyme or proper acid-base reaction. Cultural and inoculation experiments are not completely conclusive, chiefly because "takes" are obtained but do not persist like the disease itself. This condition usually begins in the scalp and may also involve the ears, temples, forehead, neck and adjacent parts. It may appear on any part of the body and spread by contiguity, but is most common on the chest, back, umbilical and in-

* A paper read at the Sixty-eighth Annual Meeting, Canadian Medical Association, Section of Dermatology, Ottawa, June 23, 1937.

guino-scrotal regions and the axillæ where the sebaceous glands are large and numerous. A soft, greasy, yellow-brown scale or crust is characteristic, in contradistinction to the micaceous scale of psoriasis.

Other disturbances of the sebaceous glands are *milium* or small cysts in the layers of the epidermis containing inspissated sebaceous material, as in Fordyce's disease. *Steatoma,* or wens, or sebaceous cysts, are sebaceous material in a fibrous capsule or retention cysts, and probably dermoids from embryonic remnants in the skin. They have a familial incidence and are usually beneath the epidermis. Nævi of the sebaceous glands also occur.

Comedones are collections of sebaceous material retained in the excretory duct of the hair follicle or sebaceous gland which is greatly distended. There may be no inflammatory element and sluggishness of the sebaceous mechanism promotes the condition. They may occur in very young babies, usually males, and in very old people, although puberty shows the most frequent occurrence.

Demodex infection is caused by a parasite which is present on the skin. In some, scaly patches simulate tinea circinata, and may enter the duct and grow there with no surface manifestation. When pressed out a torpedo-shaped shiny mass presents, which microscopically shows the *Demodex folliculorum.* This condition may accompany comedones and simulate acne when an inflammatory reaction results from the parasitic inflammation and bacterial invasion. It is important to differentiate this condition, as it requires special treatment.

Acne.—This inflammation of the sebaceous glands accompanies oily seborrhœa and comedones, and produces papules, nodules, pustules and extensive induration. This may be followed by deep fibrous nodules, scars, and even keloids, especially in the negro. The face, neck and back are most often involved. The usual age incidence is 12 to 20 years, and it also occurs in very young infants, mostly males, and nearly always in breast-fed infants. The acne bacillus is found on culture associated with the staphylococcus, although some very severe cases give sterile cultures. These patients usually have a bad sugar tolerance and are of the hypothyroid type, and gonadal disturbances are frequent. The halogens are the cause of some follicular eruptions for several reasons; the rich blood supply around the follicles; their secretion or excretion through the sebaceous glands; their special injurious affinity for the sebaceous glands. Halogen influence is commonly encountered in acne and rosacea even from the iodine present in iodized salt, which contains about ten times the dose needed for the prevention of goitre. It also manifests itself in other dermatoses. External application of halogens disturb the sebaceous glands, as seen in chlor-acne, as evidenced by the acne of halowax in industrial use.

The use of the hormone APL to adjust a dysfunction has been suggested, but practically no beneficial result has been obtained in a series of cases of very severe type which we have treated. The use of staphylococcus toxoid is beneficial in the cases where the bacterial infection is unusually prominent.

Acne rosacea is a chronic inflammatory disease of the flush areas of the face, the nose, cheeks and malar eminences, forehead and chin being the order of involvement. The basis of the condition is a vascular congestion which is the first symptom to appear and the last to leave as the disease recedes. This vascular reaction is followed by a low-grade inflammation of the skin and sebaceous glands, with an ulceration of almost trophic character. There are no accompanying comedones. Later, hypertrophy of the skin and glands, increase of fibrous tissue, and marked telangiectasia appear, and, as the condition recedes, scarring. Marked hypertrophy is termed *rhinophyma* and most often occurs in males. Rosacea occurs most often in females, the average age incidence being about 35 years, although an acne developing after 20 years of age should be checked carefully as to history. The chief clinical disturbances found in acne rosacea are mental irritability and perverted fatigue, digestive disturbances, usually characterized by hypoacidity associated with indigestion, gall-bladder disease or chronic appendicitis, and hypothyroid characteristics. Disturbances of uterine function are very often present.

Treatment is based on these clinical factors and the chronic inflammatory granulomatous pathological picture which is shown by the microscope. The use of x-ray to inhibit the glandular action and melt the granuloma in both acne and rosacea teaches us some lessons. It has been noted that if one side of the face of a

patient having acne on both cheeks is treated with x-ray both sides improve alike, suggesting the effect of the ray on the gland having other than local action. Sun sensitivity is a characteristic of nearly all rosaceas, and the longer rays of the x-ray irritate, as do the short ultraviolet rays of the sun; during treatment with x-ray it may be partly the desensitizing effect which is therapeutic. This is very noticeable in some cases, and the first few treatments exacerbate the condition in a sun-sensitive patient. As they recover from the reaction they also can be exposed to the sun's rays without the reaction they previously had.

The sebaceous glands are subject to undersecretion, oversecretion, sluggish mechanism, parasitic involvement, bacterial infection and pathological changes incidental to vascular changes. The sluggishness, bacterial infection, and congestive changes are all very closely associated with disturbances of the endocrine chain. Some points are of special interest. These reactions are rarely seen in cases of definitely hyperthyroid disease. They are common in hypothyroid types. They are associated with sugar intolerance and hypoacidity. Iodine administration may cause inflammatory reactions around the sebaceous glands, as in iodide acne, or may exacerbate one already there. This is probably due to irritation by the halogen on the structure of the gland, either indirectly by its action on the sympathetic nervous system or directly on some one of the endocrine chain. The excretion of the iodine by the gland may be an important factor. The sluggishness of the glands tending to congestion and bacterial invasion is seen during the age of gonadal activity, and is directly due to an action, whether it be depressor or excitor, on the sebaceous gland, and it may be that the sebaceous gland has an internal secretion as well as an external, or the effect may be purely against the gland itself. The reaction present in acne rosacea is entirely different, being vascular in character. But it is the sebaceous gland that is involved, and again we have an age incidence occurring in the 35- to 40-year period where we have another cycle taking place in the gonads of the opposite character to that of puberty.

CONCLUSION

It seems probable that all the disturbances of the sebaceous mechanism and the inflammatory changes in the sebaceous glands are coincidental with the endocrine chain disturbances, chiefly when the gonads, the thyroid, and the anterior pituitary are upset in their function.

It is very possible that the sebaceous glands themselves have an internal secretion which figures in the upset, and all treatment has to be along physiological lines, to balance up these endocrines or await their balance. In the meantime we endeavour to inhibit the secreting action of these glands in those diseases where it is in excess, and use local measures to keep them cleansed and infection-free.

Case Reports

A CASE OF STRANGULATED OVARIAN DERMOID CYST IN A CHILD

BY P. H. T. THORLAKSON, M.D.

Winnipeg

N.B., a girl of six and a half years, was admitted to the surgical ward of the Winnipeg General Hospital on August 21, 1937, suffering from excruciating pain in the left lower quadrant of the abdomen. The child had gone to bed the previous night in good health and had wakened in the morning with crampy lower abdominal pain, which did not radiate. The pain was intermittent in character, returning approximately every two or three minutes, but at no time had she experienced complete relief between the attacks of severe pain. She had vomited once during the morning. At the height of pain the child would scream, sit up in bed and was obviously in extreme agony. She had symptoms for five hours prior to her admittance to the hospital. Her bowels had moved and no blood had been noted. The parents stated that the patient had similar attacks on several occasions during the past three or four months. These attacks had been milder and had lasted only an hour or two. Apart from this there was nothing significant in her past history.

Physical examination.—There were no abnormal findings in the examination, apart from the abdominal and rectal examination. Temperature, 97.4° F.; pulse, 75; respirations, 24; leucocyte count, 11,000; urinalysis, negative. The entire abdomen was held rigid, but extreme tenderness and maximum rigidity were elicited in the lower left quadrant. The slightest pressure in this region aggravated the pain. A rectal examination revealed a mass situated in the centre of the pelvis. This was firm and could be moved slightly from side to side. In position, size and consistency it felt very much like a normal adult uterus.

In considering the differential diagnosis acute intussusception, volvulus of the sigmoid, acute appendicitis (pelvic), and Meckel's diverticulitis were considered, but none of these diagnoses could be reconciled completely with the history or the physical findings. Obviously the patient's condition was growing worse and an operation was advised.

Operation.—A left lower para-median incision was made, and a blackish-blue twisted left ovarian cyst was found, the size of a tangerine orange, which included the left tube. A left salpingo-oöphorectomy was performed. The appendix was also removed.

Pathological report.—Strangulated ovarian dermoid cyst.

A CASE OF LARVA MIGRANS

By A. E. McGavin

Carman, Man.

On July 31, 1937, a boy 6 years of age was brought to me with an abrasion at the tip of the left elbow, which had been caused about four days previously. Two days previously the parents had noticed a pinkish thread-like streak in the skin extending from the point of the elbow towards the bend of the elbow. This streak advanced in irregular loops and curves and at one place a circle had formed with several turns within it. I had never seen a similar case but it suggested to me the appearance of filariasis of the skin. I looked up the description of creeping eruption described in the textbooks, and found that it is caused by a larva which wanders irregularly within the deeper layers of the skin. It is identified as the larva of a dipterous insect—order Estridæ, genus Gastrophilus. It is a comparatively rare condition in northern districts but quite common in warm climates, especially along the Florida coast of the Gulf of Mexico. One case was reported a few years ago in Manitoba and two in North Dakota. There is a possibility that my case originated in the Gulf of Mexico as the boy's grandmother spent the winter of 1936-37 in Florida and other southern places, and brought back quite a collection of sea shells. The grandson frequently played with these shells, and may have been infected with the larva from that source when there was an open abrasion on the elbow. It is reported that a number of cases originated while the patients were staying at the sea shore.

The larva may continue to wander about for weeks or months and advances about one to six inches daily in irregular curves, loops, spirals and circles. It may make many concentric circles.

I thought that a strong exposure of the ultra-violet rays would destroy it, so I administered a five-minute exposure at twelve inches. This had no effect. I then applied a moist 1/2,000 bichloride dressing overnight, with no effect. The books on skin diseases recommended injection of a few drops of chloroform into the skin. I injected novocaine in four places about half an inch on each side of the apparent ending of the pinkish streak, and also half an inch in advance and half an inch behind the point. (The larva is sometimes seen with a magnifying glass as a dark speck 1/3 inch in advance of the pinkish raised line). I then injected a few drops of chloroform within this anæsthetized area. There was no further evidence of the larva. The skin became necrosed where the chloroform was injected and after a time sloughed. It gradually healed by granulation and closing in of new skin. I assisted the growth of new skin by applying a 1 per cent scarlet-pod ointment.

Therapeutics and Pharmacology

HEPARIN AND THROMBOSIS

By C. H. Best, *Toronto*

At the annual meeting of the Royal College of Physicians and Surgeons of Canada, held on October 30, 1937, Dr. D. W. G. Murray and the author presented a summary of their recent work on the effect of heparin on thrombus formation. A preliminary account of this investigation appeared in this *Journal*.[1]

The anticoagulant heparin was discovered in 1916 by Howell and Holt. When the work on this substance was begun in the Department of Physiology of the University of Toronto (1929) it appeared that two problems had to be solved before its effect on thrombus formation in human subjects could be investigated. It was necessary to secure a pure, non-toxic form of heparin and to prove that the anticoagulant prevented the formation of thrombi in experimental animals. The problem of the purification of heparin was attacked by Dr. Arthur Charles and Dr. D. A. Scott in the Connaught Laboratories. Each new preparation of heparin which they prepared was tested on experimental animals, and later some of the purer ones were administered to a group of human subjects. A detailed report of an extended study of the action of heparin on the formation of thrombi in the veins of dogs after injury was recently made by Murray, Jaques, Perrett and Best.[2] The authors conclude that the administration of heparin before and for adequate periods after injury causes a very definite decrease in the incidence of thrombus formation in veins. The injury to the veins was produced in one series of experiments by mechanical means, *i.e.*, crushing, and in another series by the injection of an irritant substance, sodium ricinoleate.

While some of the earlier preparations of partially purified heparin could not safely be administered to human subjects, a solution made from the crystalline barium salt of heparin by Dr. Charles was found to exert no toxic effects. It appeared, therefore, that answers favourable to the exploration of the effect of heparin in the human subject had been obtained in both series of investigations. In other words, a purified, non-toxic preparation of heparin which prevented the formation of thrombi in experimental animals was available.

Quite recently it has been shown by Best, Cowan and MacLean[3] that heparin prevents the formation of white thrombi in monkeys, dogs or cats when blood is made to pass through glass or cellophane tubes. With the help of Dr. James Craigie in making the photographs, a moving picture film in colour depicting the formation of white thrombi has been prepared by Mr. C. R. Cowan and the author. This film was shown at the meeting referred to in the opening paragraph.

While post-operative thrombosis in human

1. Murray, D. W. G., Jaques, L. B., Perrett, T. S. and Best, C. H.: Heparin and vascular occlusion, *Canad. M. Ass. J.*, 1936, **35**: 621.
2. Murray, D. W. G., Jaques, L. B., Perrett, T. S. and Best, C. H.: Heparin and the thrombosis of veins following injury, *Surgery*, 1937, **2**: 163.
3. Best, C. H., Cowan, C. and MacLean, D. L.: In press.

patients constitutes one of the major complications the incidence is happily not great. It will therefore be necessary to administer heparin in a very large number of cases before anything definite can be said about the effect of this material on the frequency of thrombus formation. Heparin has now been administered in the Department of Surgery of the Toronto General Hospital in some 230 cases. Most of these patients had undergone an extensive abdominal operation.

It is thought that heparin may be useful in various operations on blood vessels. Dr. Murray and his colleagues have found it of advantage in doing end-to-end sutures of blood vessels in experimental animals and in the transfer of organs from one site to another. Dr. Murray feels that it may be possible to prevent the formation of a new thrombus after embolectomy by the use of heparin. Encouraging results have been obtained in the clinic in the treatment of certain types of thrombophlebitis, and it is hoped that more of these cases may be studied in the near future.

A great many new problems have been brought to light by the work recently carried out in this field. An effort is being made in the Department of Surgery to detect the cases in which thrombosis is likely to occur, but adequate tests are not as yet available. Further experimental work is being conducted in an effort to determine the rôle of heparin in blood vessel surgery. In the Connaught Laboratories there are many problems associated with the production of heparin in large amounts in a pure form and at a reasonable price. In the Department of Physiology and in the School of Hygiene experimental studies are being conducted by Dr. D. Y. Solandt and the author on the effect of heparin on coronary thrombosis produced in dogs by experimental means. There are many problems, too, in connection with the physiology of the blood platelets.

The clinical investigation of heparin is warranted, first, because it is established that this can be done safely and, secondly, because the results on experimental animals justify the conclusion that heparin prevents the formation of thrombi. While the therapeutic possibilities of heparin are as yet quite unsettled, an effort is being made to advance knowledge in this field.

THE VALUE OF THE ZINC SULPHATE NASAL SPRAY IN THE PROPHYLAXIS OF POLIOMYELITIS

An outbreak of poliomyelitis which occurred in Toronto during the months of August, September, and October, with an incidence rate of 1.1 per 1,000 population, afforded an opportunity for a trial of a nasal spray containing 1 per cent zinc sulphate, 1 per cent Pontocaine, and 0.5 per cent sodium chloride. In the spraying, 0.5 to 1 c.c. of solution was introduced into each naris and the spraying was done on two occasions with an interval of approximately 12 days. The spraying was done according to the technique of Peet, Echols and Richter, but differed from their recommended procedure in that it was not administered on three successive days, since it was considered that it would not be practical to do so. The work was done by the attending otolaryngologists, 44 in number, of eight hospitals in the city. Ninety-seven clinics were held. The staff of each clinic consisted of an otolaryngologist, a graduate nurse as assistant, a clerical assistant for recording the spraying, a public health nurse for recording personal data concerning the child, and an undergraduate nurse for taking the child's temperature. In the period of one week from the authorization of the study, 5,233 children had received the first spraying, indicating the success of the presentation to the public and the efficiency of the organization. The second spraying extended from September 13th to September 16th and supplementary clinics were held on September 20th, a total of 89 clinics being held. The work was conducted without the occurrence of any complications, the immediate after-effects seldom giving discomfort for more than twenty-four hours.

A representative control group of 6,300 children was obtained in the city proper. As suitable control groups could not be obtained in the 12 suburban municipalities, 621 children resident in these municipalities who received the two sprayings in the clinics and 158 in private practice were not included in the analysis. Included in the study, however, were 749 children who were sprayed by the same group of otolaryngologists in their private practice and concerning whom satisfactory data were obtained, making a total of 4,713 children resident in Toronto.

Among the 4,713 children who were sprayed, 11 cases of poliomyelitis occurred to October 12th, 30 days from the second spraying. One of these occurred 6 days after the first spraying and was not included in the analysis. In the control group of 6,300 children, 18 cases occurred during the period. The attack rate in the period 7 days after the first spraying to 10 days after the second spraying was 1.7 per 1,000 in the sprayed group and 2.1 in the control group; in the period 7 days after the first spraying to 20 days after the second spraying, 2.1 in the sprayed group and 2.4 in the control group; and in the period 7 days after the first spraying to 30 days after the second spraying, 2.1 in the sprayed group and 2.9 in the control

group. The differences between the attack rates in the sprayed group and the control group were not statistically significant. In the suburban group, which included 621 children sprayed in the clinics and 158 in private practice, no cases were found to have occurred. In the total of the city and suburban groups the attack rates for the period 7 days after the first spraying to 30 days after the second spraying were 2.9 in the control group and 1.8 in the sprayed group. This difference also was found not to be statistically significant.

CONCLUSIONS

1. This study furnishes no evidence of the protective value of a nasal spray containing 1 per cent zinc sulphate, 1 per cent Pontocaine and 0.5 per cent sodium chloride, when 0.5 to 1 c.c. of the solution was sprayed into each naris on two occasions with an interval of approximately 12 days, the spraying being performed by otolaryngologists with equipment suitable for spraying the olfactory area.

2. As the spraying employing the method used in this study must be conducted by otolaryngologists or other physicians specially trained in intranasal treatment, requires special facilities, and cannot be done sufficiently quickly to meet the emergency of an outbreak, it cannot be considered a practical procedure.

—This summary is abstracted from a paper by Tisdall, F. F., Brown, A., Defries, R. D., Ross, M. A. and Sellers, A. H., *Canad. Pub. Health J.*, 1937.—ED.

Clinical and Laboratory Notes

A TECHNIQUE FOR TREATING FRACTURES OF THE HEAD OF THE FEMUR

BY MALCOLM C. MOONEY, B.A., M.D., C.M.

Jeffery Hale's Hospital, Quebec

The general rules for the treatment of fractures have always been to obtain anatomical and functional alignment, then fix the joints above and below the fracture line. However, the principles of the technique relating to the head of the femur are in distinct contradiction of these established rules. It follows them as far as the reduction of the fracture goes, but there the similarity ceases. Stability of the fractured parts is obtained by fixation to the well limb without regard to the joints above and below the fracture line.

Formerly at the Jeffery Hale's Hospital we had been using the Whitman spica, and though we obtained fair success with a few cases there were too many failures. In addition, there was the discomfort of the patient and the many difficulties of the after-care, well known to all who have used this and similar spicas. In several cases where the spica had not been sufficiently strengthened about the affected hip, moving the patient during the toilet care caused it to crack and lose its efficiency. It was merely to steady the cast at this point that we first employed a bar of wood fixed to the well leg. In this way it was possible to make a lighter cast about the affected hip and still retain sufficient strength to avoid cracking. During a discussion following the application of one such cast it was suggested that the bar could be used for traction counter-traction as well as just for steadying. This was attempted on the next available case and was so successful that we have since been employing it. At present we have 7 successes in 7 living patients, all able to walk about unaided by a cane. This is a small series, but each patient has been so comparatively comfortable and the nursing care so much simplified that we venture to publish the technique. In doing so no claim is made as to its originality, but only that it is a useful modification. The simplicity of its application and necessary equipment merits attention. It can, if necessary, be applied in the home, on an ordinary bed or table, the only requirements being a few assistants, a bar of wood and the usual plaster equipment. Thus it can be of use in isolated districts as well as the hospital.

The principles and the steps of the technique can best be shown by a series of simple diagrams. The patient is placed on a Hawley table, and the feet attached to the foot-extension rods. The legs are further supported by an overhead sling applied about the knee joint. This also allows a slight degree of flexion to be made at this joint. The rod against which the pubes rests prevents the descent of the body. In these cases the only sedative employed was morphine.

Fig. 1.—Shows the patient on the Hawley table with the typical shortening and eversion of the affected limb.

Fig. 2.—The pelvis is fixed by extreme abduction of the well limb, just enough tension being applied to this limb to steady it.

Fig. 3.—The fracture is reduced by abduction, traction and internal rotation, with sufficient traction held to maintain the leg in correct position. Before proceeding further, check x-rays are taken to ensure proper reduction.

Fig. 4.—The well leg is swung over (the tension remaining the same) towards the

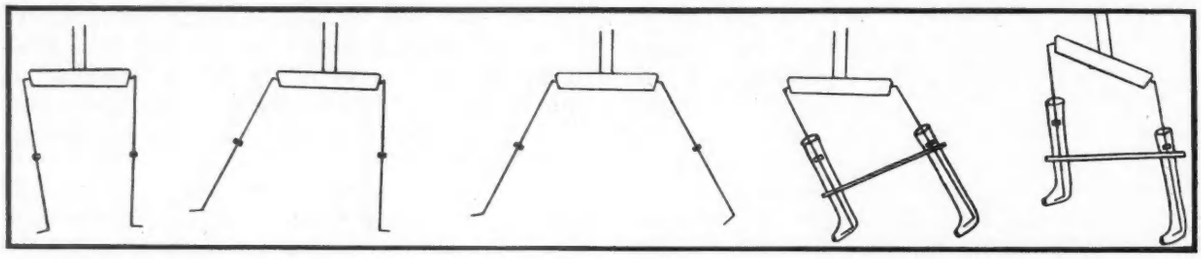

Fig. 1 Fig. 2 Fig. 3 Fig. 4 Fig. 5

fractured one until the knees are about eighteen to twenty inches apart. The affected limb remains fixed. Plaster casts are then applied to both legs reaching from about six to eight inches above the patella down to but not including the toes. We found it more comfortable for the patient to place first a longitudinal slab of plaster anteriorly the entire length of the cast before beginning the encircling layers. It is important that the cast be carried down to the toes. In the first two cases we carried them only as far as the malleoli, and the patients complained of pressure on these points. This pressure required cutting away pieces of the cast every few days. Since carrying the casts down to the toes no such complaints have been made. When the casts have partially dried a wooden crossbar is applied a little below the patellæ reaching across the two casts, and held in place with plaster bandage. An ordinary piece of wood, 2″ x ¾″, and about two feet long, is used. The casts are now allowed to dry and harden. The attachments on the feet are then removed, the legs swung back into the long axis of the body, and the remaining paraphernalia removed. The patient is moved back to his bed.

Fig. 5 shows the final result with the patient lying in bed. The legs have been swung back into the long axis of the body and the resulting tilting of the pelvis is shown. Thus we have the fractured limb in the corrected position held in extension abduction and internal rotation.

As soon as the cast has sufficiently dried it is possible to flex the legs at the hip joint, and by the second or third day the patients are all able to be placed in the full sitting position, or at least half sitting up. The fact that they can be moved in this manner is naturally a boon to the nurses, and a factor in reducing hypostatic congestion of the lungs. That the corrected position is retained was well demonstrated by our third case.

The patient was a labourer, 42 years of age, who developed an alcoholic psychosis on the fourth day, continuing to be delirious for about a week. During this time he managed to get out of bed three times and once even hauled himself on to his feet. On his return to normal we were much relieved when x-ray plates showed the fragments in the same position as before.

Otherwise, the after-care does not differ from other techniques, except that the patients may sit up in a chair after the third week with the plaster-encased legs supported on a stand.

THE EFFECT OF EXTERNAL TEMPERATURE ON SEDIMENTATION

D. B. Rosenthal points out that the profound influence of the external temperature on the blood sedimentation rate has been largely ignored. He floated tubes in conical flasks maintained at temperatures of 40°, 60°, 80°, and 100° F., estimated the sedimentation rate according to Culter's technique, and plotted graphs of the results. He found that the higher the temperature the more rapid the fall within the temperature range indicated. With "slow" blood the difference in the sedimentation index corresponded roughly to the difference in temperature; with "fast" blood the end-point, a measure of cell volume, gave no indication of the effect of temperature on the rate. A mathematical correction for room temperature variation is not yet practicable. Rosenthal emphasizes the need for greater accuracy in recording sedimentation rates, and suggests: (1) that a standard temperature of 68° F. be used, or, if this is impracticable, that the room temperature be included in the report in order to make provision for variations; (2) that the cell volume be recorded. This can be done by centrifuging the tube or immersing it in a water-bath at 100° F. and noting the height of the sediment as a percentage of the total height of the blood column. In "fast" blood the sedimentation index is a measure of the cell volume, not of the sedimentation velocity, and the disparity between the sedimentation index and the cell volume indicates approximately to what extent the former is a measure of the sedimentation velocity. In the absence of any thermometric standards comparison of tests performed at different times on blood from the same source provides no reliable information.—*Med. J. Austral.*, Jan. 30, 1937, p. 172. Abs. in *Brit. M. J.*

Editorial

THE JOURNAL

WITH the advent of a new year and a new volume the *Journal* extends to our readers hearty good wishes for health, wealth and happiness. The Editors wish also to express their appreciation of the many expressions of interest and cooperation which they have received from various quarters. They will strive to make the *Journal* more acceptable than ever.

The year 1938 may prove to be an epoch-making one in the history of the Association. For one thing, we look forward with hope and, indeed with some assurance, to the proposed federation of the various provincial medical societies with the national body becoming an accomplished fact. The auguries are favourable. This means that the *Journal* will have to cater to a larger clientèle and a wider range of tastes. To meet the new conditions adequately the *Journal* will need the aid of all our members.

Then, this year will see the inception of a national Society for the Control of Cancer. Doctor McEachern's editorial in this issue gives a statement of the progress achieved thus far.

The Executive of the C.M.A. has approved the proposal to create a Sub-committee of Medical Research under the ægis of the National Research Council of Canada. It is hoped that this may be the first step towards the creation of a National Council for Medical Research in Canada.

The Canadian Medical Association has been invited to "sit in" at the meetings of the Rowell Commission, and will do so at the appropriate times through its officers. Thus it will have an opportunity to present the views of the profession on such matters as a national scheme for health insurance in Canada, the relationships between the provincial and federal departments of health, and the remuneration of the medical profession for the medical care of the indigent. It may be remarked in passing that the Rowell Commission is the first commission ever appointed in Canada to deal with questions on a nation-wide basis. It is hoped that its deliberations will lead to the establishment of much-needed advances. Further on these topics can be found in this issue under "Association Notes".

The Editors have endeavoured to put out a well-balanced journal, one that presents the best products of Canadian research and at the same time offers papers of practical clinical value. It is too much to hope that any one person will read the *Journal* from cover to cover, though we venture to think that this feat would be worth while; probably, only the Editor-in-Chief has the time and the necessity to do this! It may even be that few of the articles are read in their entirety; hence a summary at the end of the article meets a need. However, the Editors will think they have succeeded well if they produce a journal which the individual member will pick up with the feeling, "Here I am sure to find something to interest me."

For some time each issue of the *Journal* has contained some article of a research character. This, we think, is good policy. If such articles are refused the authors must, perforce, turn to other journals, and, so, much of the credit which should go to Canada is diverted to other countries. It may be remarked in this connection that with few exceptions the research papers that have been published have had a practical bearing or have announced some important discovery. There is much need for a special journal or journals to take care of such.

Nevertheless, we shall endeavour to meet the needs of the general practitioner more fully than before A new Section entitled "Therapeutics and Pharmacology" has been established which will offer helpful suggestions and will bring before our readers the latest and best in diagnosis and treatment. The items in this section will be brief, written by men who are well qualified to express opinions.

In the future the Editors will be obliged to refuse papers of inordinate length, no matter how good, except under extraordinary circumstances. Long papers are re-

pellent and, it is safe to say, in most cases not read. They are put aside for that "more convenient" season which never comes. A manuscript of fifteen quarto pages of typescript, *double-spaced*, is of a desirable length. Contributors will aid greatly if they will list their references according to the rules of the *Journal*. References should also be checked before the papers are sent in; not infrequently we find serious errors therein. An incorrect reference is worse than useless; it is misleading.

Members can contribute to the popularity of the *Journal* by sending in *brief* notes on interesting cases thay have met, citing the salient clinical features, with the treatment adopted, and giving the result. One page of the *Journal* or less is a suitable length. Rare cases are interesting and, of course, should be reported, but everyday experiences are more generally helpful.

Our readers, also, should use our Section of "Letters, Notes and Queries". Here they can ask questions, express their ideas, and even criticize opinions advanced in the published papers. A good controversy, if courteously carried on, is always readable, and, usually, illuminating.

The Editorial Committee on Advertising continues to give careful thought to this difficult subject. Most advertising matter contains an element of exaggeration, for no concern is content to cry "stinking fish". Advertisements may be divided into three classes—true, false, and half-true. The first and second are easily dealt with. The third always gives trouble, for here it is difficult to check up on the statements, as the Association has no department of research on these matters to which the *Journal* can turn. We have largely to follow the practice of other reputable journals. We do reject, however, much advertising matter that is offered and make representations to the advertisers in cases where we think their statements require modification or excision. Fortunately, our advertisers realize that, to be effective, their matter must not offend the scientific sense of our readers, and have been willing to accept our suggestions in a cooperative spirit. In all this, however, it must be remembered that in the case of a journal such as ours the advertising pays the bills and we have to exercise discretion. Ruthless pruning methods are hardly possible in these days. We are doing our best.

Let us all work for the good of the *Journal*.

A G.N.

THE CANADIAN CAMPAIGN AGAINST CANCER

AT its annual meeting in Ottawa in June the Canadian Medical Association decided to take the initiative in organizing the people of Canada in a campaign against cancer. This step was taken with the approval of the Trustees of the "King George V Silver Jubilee Cancer Fund for Canada." The Association appointed a committee, with power to act, and instructed it to proceed with the work of organization. This was done in accordance with plans of which the details appear in the Report of Council for 1937. One of these required that within the Canadian Medical Association itself there be established a "Department of Cancer Control". The other outlined the organization of a "Canadian Society for the Control of Cancer" in which membership would be open to all Canadian citizens, and which would invite to become affiliated with it all organized bodies which would volunteer to give to it the aid of their organized strength. The Canadian Medical Association had already committed itself to become affiliated and to place at the disposal of the "Canadian Society for the Control of Cancer", when formed, all of its organized facilities which could be used in the fight against cancer.

The committee began in July by appointing two sub-committees with interlocking personnel in order to ensure close cooperation. The first was responsible for the establishment of the Department of Cancer Control of the Canadian Medical Association; the other was responsible for organizing the Canadian Society for the Control of Cancer. Each of these sub-committees has utilized and secured the enthusiastic cooperation of every province in which the profession

has organized itself into a Provincial Medical Association with constituent district and local medical societies.

The organization of the Department of Cancer Control has already progressed to a stage where Cancer Study Committees are being formed in hospitals of the one hundred bed minimum capacity. In one province this part of the organization has been completed. In at least three other provinces the work has progressed so far that it will probably be completed by the time this goes to press.

An Authorship Committee has been formed. It is already at work preparing a book on cancer; this will present in concise but comprehensive form the early signs and symptoms of cancer in the various sites. When complete, it will be the result of the collaboration of the physicians and surgeons of the universities of Canada. It is proposed to place a copy in the hands of every Canadian doctor.

The organization of the Canadian Society for the Control of Cancer is necessarily a more difficult task. The sub-committee responsible for this has appointed a Provisional Board of Directors composed of three prominent laymen and three doctors. This Board is proceeding with the work of organization. Already it has taken steps to organize a provincial branch in each province, where a branch or a division of the Canadian Medical Association exists. With this end in view a member of the Provisional Board of Directors recently visited each of the Canadian provinces. In each he conferred with the officers of the Provincial Medical Association. In eight provinces these men are now engaged in securing the consent of active laymen and women to act as the officers of the provincial branch of the Cancer Society.

So soon as provincial branches are organized they will be invited to elect a representative to the Grand Council of the National Society. The Council thus constituted will then convene and constitutionally appoint a Board of Directors which will replace the Provisional Board.

It is hoped that the Society will serve as an agency which will enlighten the Public regarding the early signs and symptoms which may be indicative of cancer and the benefits which result from early recognition and prompt treatment. It should also serve to stimulate those who can afford to do so to make financial contributions which will make it possible to extend aid to research workers.

From time to time readers of the *Journal* will be supplied with detailed information relating to the progress of this work of organization.

J. S. MCEACHERN

Editorial Comments

Vaccination Against Whooping Cough

The somewhat unsatisfactory results of some workers with *H. pertussis* vaccine led the Council of Pharmacy of the American Medical Association to omit this form from the list of "new and unofficial remedies" in 1931. Since this time more favourable results have been reported in children by Madsen in the Faroe Islands, Sauer in Chicago and Kendrick in Grand Rapids. In the last instance, of 1,592 children, 712 vaccinated and 880 controls, 67 cases of whooping cough developed, of which only 4 were in the vaccinated group. To what may one ascribe their apparent success? In each case the vaccines contained 10 billion killed *H. pertussis* per c.c., the organisms having been cultured on some form of Bordet-Gengou medium, enriched in one case with horse, in the second with human, and the third with sheep blood. The bactericidal agents used for killing the organisms were formalin, phenol and merthiolate respectively. Large doses were employed by Sauer and Kendrick and smaller ones by Madsen. One common factor however was the use of "young", "recently isolated" or "phase I" cultures, and it is this that we would like to stress. For the work of Leslie and Gardner, Lawson and Shibley, and Hoelscher has shown that this organism occurs in various phases, or R and S forms if you will. This change from virulence to avirulence seems to occur readily, yet there are apparently no different specific sub-types in the whole group. Can it be that in the vaccines that failed completely virulent forms were not used? So much for the use of vaccines of whole organisms in man.

In animals the most recent experimental work is to be found in a paper by Burnet and

Timmins.[1] They describe a novel method of infecting anæsthetized mice by intranasal instillation of an emulsion of living *H. pertussis,* and in one experiment where a carefully computed infecting dose was employed were able to show definite protection, using a formol-killed vaccine.

Several other vaccines have been described, *i.e.,* Kreuger's extract of *H. pertussis,* the Mulford Laboratories' soluble vaccine, and the Glaxo Laboratories dissolved vaccine. But the most advanced work with a fractional antigen is that of Cruickshank and Freeman.[2] They have succeeded in chemically separating an antigen from cultures of *H. pertussis* which in suitable dosage will protect mice against an intraperitoneal inoculation of this organism lethal for control animals. This work appears to offer high promise, and it is to be hoped will before long be applicable to human beings since whooping cough still ranks among the distressing contagions with disagreeable after-effects. ARNOLD BRANCH

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Proposed Organization of Canadian Physicians Interested in Physical Therapy

Recently a letter was forwarded by Dr. R. B. Taylor, of Montreal, to the Superintendent of each of the hospitals listed by the Department of Hospital Service of the Canadian Medical Association, asking them to pass this letter to the Physician-in-charge of the Department of Physical Therapy of their hospital or to some member of the staff who is interested in the subject, calling attention to the fact that an attempt is being made to organize a Committee on Physical Therapy under the jurisdiction of the Canadian Medical Association.

It is desirable that every physician in Canada who is interested in this subject should have representation in the Councils of the Canadian Medical Association. Physical therapy has become more and more a part of modern medicine. Such an organization will increase the respect of the doctors in Canada for this subject, and in addition will give those interested an opportunity of cooperating with one another in the solution of their problems.

Will every physician who is interested communicate immediately with Dr. Ross B. Taylor, 324 Medical Arts Bldg., Montreal, Que., in order that he may have the necessary data to present to the Executive Committee when they meet in the near future? The assistance of the Council on Physical Therapy of the American Medical Association in the organization of a Committee similar to their own has been assured. If certain hospitals or individuals have been omitted it has been due to lack of addresses. Dr. Taylor will be pleased to hear from all physicians interested in physical therapy. A.G.N.

The Panel System

Dr. W. A. Jones, of Kingston, Ont., writes us in regard to the working of the Panel System in Great Britain. Our General Secretary was in Europe last summer gathering data in regard to this matter and on health insurance generally. He brought back a very complete and illuminating report. But, of course, his information, whether for or against, was derived from local (British) sources. Doctor Jones makes the suggestion that it would be interesting to get the views of Canadian doctors who have worked in Britain under the system, whether as *locum tenentes* or in other capacities. Some of those who have done so have come back to Canada with an unfavourable impression. That there are certain shortcomings in the practical operation of panel practice most would admit, but, no doubt, the merits of the system exceed the demerits. However, we would be glad if any Canadian doctor who has personal knowledge of the operation of the scheme would communicate his views to us through the General Secretary. Let us have the facts. A.G.N.

Dr. Eugene St. Jacques

We learn with pleasure that the Academy of Sciences in Paris has granted the Montyon Prize to Dr. Eugene St. Jacques, Professor of Surgery at the University of Montreal, for his work on the treatment of acute infections by intravenous carbon.

This prize, amounting to fifteen hundred francs, was to be formally conferred at a public meeting of the Academy on Monday, December 20th. We tender Dr. St. Jacques our congratulations on this signal honour. H.E.M.

Retrospect

SOME MEDICAL ASPECTS OF TOBACCO

BY W. J. MCCORMICK, M.D.

Toronto

Since the publication of the famous "Counterblaste" by King James 1st of England in 1604 there has been a continuous and voluminous contribution to the world's literature relative to the merits and demerits of tobacco, the latter being greatly in preponderance. Until comparatively recent years most of these diatribes have been based on presumptive rather than scientific evidence. But with the advance of laboratory technique and precision our knowledge of the effect of tobacco on the human organism has taken on a more definitely scientific phase, so that effects that have heretofore been recognized clinically are now confirmed by laboratory findings.

The predominant effects of tobacco have long been regarded as referable to its action on the cardiovascular, digestive and nervous systems. "Tobacco heart" and "smoker's cancer" were, perhaps, among the first clinically noted effects of tobacco.

The prevalence of "tobacco heart" was very noticeable in the medical examination of military recruits for the Great War, the rapid and erratic heart action of heavy smokers being a frequent cause of rejection. The average pulse rate of smokers was found to be considerably faster than that of non-smokers, and a further exacerbation was noted during the act of smoking. In 23 out of 27 subjects Aikman[1] found a marked increase in pulse rate following the smoking of but one cigarette. In 7 of his subjects the increase was less than 8 per minute; in 7 it was 8 to 15 per minute; and in 9 the increase was 15 to 24 per minute, the average increase being 14 beats to the minute. In 10 of his cases the pulse, which had been regular, became irregular after smoking, and in several, markedly so.

A more forceful demonstration of the effect of tobacco on the heart action was recently recorded by Sontag and Wallace[15] in their observation of the effect of maternal smoking on the pre-natal pulse rate. They made 81 recordings of the fetal heart rate in five prospective mothers, before and after the smoking of a cigarette. Four of their subjects were habitual smokers, while the fifth had never smoked previously. The average fetal heart rate prior to maternal smoking was found to be 144 per minute. This in itself is significant in view of the fact that the normal average fetal heart rate is 130, as reported by obstetricians thirty years ago when smoking by women was not in vogue. Within eight to twelve minutes after a cigarette was lighted and smoking begun they found a further average increase in the fetal pulse of five beats to the minute, in spite of the fact that in one of the subjects, the non-smoker, there was an actual decrease in the rate, due perhaps to the fact that she did not inhale and expelled the smoke from her mouth as quickly as possible. To eliminate the possibility of fractional errors in computation a stop watch was used in these tests, the actual time elapsing during the counting of ten beats being recorded, instead of counting the number of beats heard during a given length of time, as is commonly done.

For many years physicians (notably Erb, Buerger and Silbert[14]) who have had an extensive experience with the vascular affection known as thrombo-angiitis obliterans (Buerger's disease), have definitely linked the use of tobacco with this malady as a causal factor. The physiological basis for this relationship seems to have been found recently by a number of laboratory research workers, attacking the problem from different angles. In 1932 Maddock and Coller,[9] by means of delicate skin temperature tests, demonstrated a definite peripheral vasoconstriction following smoking. In a subsequent report they showed that this hypertensive effect was due essentially to the nicotine content of the tobacco smoke. As evidence of this they found that nicotine, injected intravenously in amounts theoretically equivalent to the smoke absorption, produced approximately the same decrease in skin temperature of fingers and toes, and the same increase in blood pressure and pulse rate, as was obtained from smoking. These findings were subsequently confirmed by the work of Barker, and Wright and Moffat,[17] Johnson and Short, and Lampson.[6] The author last mentioned made use of a plethysmograph to register the speed of arterial blood repletion in the hand after application of a constricting band at the wrist to prevent venous return, thus indirectly indicating the degree of vasoconstriction produced. He found that the smoke of a cigarette, when inhaled, produced an immediate and pronounced peripheral vasoconstriction lasting about an hour. When smoked without inhaling the effect was of the same character, but of shorter duration—about a quarter of an hour. Wright and Moffat[17] found that the smoking of a cigarette produced such pronounced vasoconstriction that the skin temperature of the fingers dropped from 1 to 15° F., and the circulation of blood in the small

capillaries of the nail folds, examined microscopically, showed a marked slowing-up, and in some cases a complete stasis.

More recently, Maddock, Malcolm and Coller[10] made further investigation of the cardiovascular effects of tobacco in an effort to determine if there were any special features which might explain the predilection of thrombo-angiitis obliterans for males and for members of the Jewish race. They also investigated the possible relationship of the allergic sensitivity to tobacco and the cardiovascular response to smoking. (Harkavy and his associates and Sulzberger had previously reported that 80 per cent of their cases of Buerger's disease gave a positive allergic skin reaction to tobacco). As to the influence of sex they found that cigarette smoking produced practically the same reduction in peripheral skin temperature and the same increase in blood pressure and heart rate in women as in men. They pointed out, however, the possibility of a sex hormone giving to the female in some way a relative immunity to the cardiovascular effects of tobacco, and referred to the work of McGrath, who found that large doses of theelin prevented the development of gangrene of the tail in female rats following toxic doses of ergotamine, a strong vasoconstrictor. The well recognized greater resistance of the mammalian female to toxines in general may have a bearing on the matter. It should also be noted that the use of tobacco by women is of comparatively recent adoption. As to racial predilection, Maddock and his associates found that smoking produced greater peripheral hypertension in Jewish subjects than in gentiles. Allergic sensitivity to tobacco, however, was found to bear no definite relationship to the cardiovascular effects of smoking. This they accounted for by the possibility that the former may be due to some element in tobacco other than nicotine, whereas the latter is definitely referable to the action of nicotine on the sympathetic nervous system.

In this connection a brief study of the mechanism involved in the cardiovascular effects of tobacco may be of interest. Nicotine, the active alkaloid of tobacco, excites the sympathetic nervous system, resulting in peripheral vasoconstriction and cardiac acceleration. At the same time, through the same mechanism, the emergency action of the adrenal glands is brought into play, releasing adrenalin into the circulation, which reinforces and parallels the effect of sympathetic stimulation. The adrenalin release produces in addition to vasoconstriction a pronounced increase in the blood sugar concentration, owing to its glycolytic action in the liver and muscles, and a noticeable increase in the respiratory quotient; and, as shown by the writer[11] in a previous paper, all these features of the sympathico-adrenal response to nicotine constitute a protective reaction of the organism well adapted to counteract the toxic absorption. It is not difficult, therefore, to visualize the possibility of repeated exaggeration of this protective response, as in tobacco habituation, resulting in organic changes in the peripheral blood vessels of hypersensitive subjects, similar to those of thrombo-angiitis obliterans, brought about, perhaps, as a result of impaired blood supply to the walls of the blood vessels themselves (vasa vasorum), as pointed out by Von Oppel. As aptly stated by White,[16] "If an emergency is too severe or too long continued, the very factors which normally act to preserve the organism may lead to its dissolution".

As corroborative evidence of the tobacco factor in the etiology of Buerger's disease, Friedlander, Silbert and Laskey[4] produced gangrene in the toes of albino rats as a result of intraperitoneal injections of tobacco extract in sub-lethal doses. Of 48 male rats so treated, 33 developed gangrene within 5 to 12 weeks. None of 12 female rats subject to the same treatment developed this lesion in 5 to 18 weeks, again demonstrating the relative immunity of the female. Of 10 control male rats, living under the same conditions, none developed gangrene. Of 6 rats subjected to daily inhalation of tobacco smoke, one male developed lesions identical with those produced by the injections.

In a previous paper on thrombo-angiitis obliterans, Silbert,[14] in recounting his experience with this disease, refers to the rôle of tobacco as follows.

> "The importance of tobacco as the exciting cause of this disease must be stressed. The evidence in support of this contention is overwhelming. In over a thousand instances of this disease studied by the writer a typical case in a non-smoker has never been seen. Cessation of smoking regularly arrests the disease, while continued use of tobacco is coincident with progression. In innumerable instances, patients who have been restored to good condition by treatment and elimination of tobacco have shown recurrence of the trouble when they resumed smoking. In practically all cases of relapse, with ulcer formation, gangrene or amputations, patients have admitted returning to the use of tobacco. In several early cases of the disease, cessation of smoking, without any treatment whatsoever, has resulted in complete disappearance of all symptoms. This regular association of the use of tobacco with the recurrence and progression of the disease is too striking to be ignored. Although a constitutional susceptibility to tobacco must be assumed, the rôle of this agent as the exciting cause cannot be doubted."

Relative to the effect of tobacco on the digestive and respiratory systems, recent work on the cancerogenic properties of certain hydrocarbon distillates seems of interest. It has long been known that workers who handle pitch, and others who are employed in the manufacture of briquets from pitch and coal dust, frequently suffer from skin cancer. Likewise, shale oil workers coming in contact with crude paraffin,

a natural distillation product, and chimney sweeps exposed to soot, a distillation product of coal, are known to be unduly prone to skin cancer. Recently Cook, Hieger, Kennaway and Mayneord, working in England, and Morton, Branch and Clapp,[12] in America, were able to isolate from coal tar certain benzene derivatives, such as benzpyrene, dibenzanthracene and triphenylbenzene, which, when applied to the skin or injected subcutaneously in mice, would produce cancer. This discovery throws new light on the possible rôle of tobacco in the causation of cancer of the lip, mouth, stomach and lungs, affections notably predominant in males, who in smoking expose these parts to the irritant action of the distillation products of tobacco. Thus it seems that certain products of combustion and distillation of the organic matter of the tobacco, aside from the thermal and mechanical irritation associated with smoking, may sensitize the skin and mucous membrane of the respiratory and upper digestive tracts to cancer. In 100 cases of cancer of the mouth reported by Abbe, 10 were in women and 90 in men. Of the 90 men all were heavy smokers, with the exception of one who had cancer of the lip on the site of an old baseball injury. According to Hoffman the death rate from cancer of the lungs has almost trebled since the Great War. Comparing this increase with the parallel increase in tobacco consumption one is led to believe that smoking may be the responsible factor. In reference to this Bogen and Loomis[3] say: "It may be of interest to note in this connection that the only woman with this condition (lung cancer) autopsied at the Olive View Sanitarium (Calif.) gave a history of more than 15 years' excessive smoking of cigarettes".

As to gastric and duodenal ulcer, Ochsner, Gage and Hosoi,[13] in a recent paper on peptic ulcer, submit irrefutable evidence of the causal relation of tobacco. After referring to the observations of others in this respect, they say: "We are so convinced that smoking is detrimental to patients with peptic ulcer that we refuse to treat such an individual unless he will abstain from smoking." In a series of duodenal ulcer cases Gray found that 96 per cent were smokers. He regards tobacco as one of the principal causes of peptic ulcer. Moll and Flint found that smoking increased the secretion of hydrochloric acid in the stomach, a condition conducive to ulceration. Lickint found that smoking decreased the secretion of pepsin and rennin, thereby inhibiting protein digestion. Friedrich believes that cigarettes are specially harmful in this respect, since most cigarette smokers inhale, thereby greatly increasing the absorption of nicotine. He regards the action of nicotine on the stomach as two-fold: first, producing vasospasm in the gastric mucosa, which he was able to observe microscopically; and, secondly, increasing acidity. The former he attributes to the direct action of nicotine on the blood vessels, or to the release of adrenalin as a result of the action of nicotine on the adrenal glands. The vasospasm, by producing ischæmia of the gastro-duodenal mucosa, favours necrosis and ulceration. Eighty per cent of Friedrich's male patients with stomach ulcer were heavy smokers. Of 34 of his patients who smoked heavily after operation, although instructed not to do so, half had recurrence of symptoms; whereas, of 44 who curtailed their smoking, only 6 had mild symptoms. He found smoking particularly injurious in gastro-enterostomy cases. Of 14 such who failed to limit their post-operative smoking only 4 were free from relapse; while of 30 who did reduce their smoking only 4 had a return of symptoms. He cautioned against the practice of smoking before breakfast, when the stomach was void of food which might act as a diluent and neutralizer of the excess acidity produced. In view of the well-recognized fact that cancer not infrequently develops on the site of chronic gastric and intestinal ulcers, smoking may thus be seen as a possible indirect cause of the predominant incidence of this type of cancer in men. According to McNally, in Holland where tobacco consumption is greater than that of any other European country the mortality from cancer of the stomach is almost double that of England.

While nicotine has been generally recognized as the most potent morbific ingredient of tobacco smoke, there are other toxic products of combustion and distillation which must be considered. Carbon monoxide, ammonia, formaldehyde, methylamine, methane, methyl alcohol, hydrogen sulphide, pyridine, furfurol, arsenic, carbolic acid and prussic acid are all recognized constituents of tobacco smoke. Fortunately, however, most of these are present in minute quantities. Carbon monoxide seems to be the major exception. One gram of tobacco when smoked in a cigarette may develop as much as 70 c.c. of this lethal gas, while the same amount smoked in a pipe may produce 105 c.c. Recent research relative to this constituent of tobacco smoke demonstrates its biological potentiality. Ruhl and Lin studied the problem by submitting subjects to varying atmospheric pressure in airtight caissons while smoking. They discovered that a rarefied atmosphere, of decreased oxygen content, facilitated intoxication by tobacco smoke; which would be in harmony with the effects of carbon monoxide. The proportion of this gas in the expired air of smokers is found to vary from 0.025 to 0.03 per cent. Of much greater significance is the degree of its absorption in the blood of the smoker. In 25 subjects who inhaled while smoking, the carbon monoxide content of the blood was found to average 0.1

per cent, with a maximum of 0.7 per cent. In another group of heavy smokers the average was found to be 0.26 per cent. These observations were made in the forenoon, while tests made in the afternoon, after the consumption of a greater amount of tobacco, showed an average of 0.52 per cent, with a maximum of 0.85 per cent. Comparative tests were also made in the same subjects before smoking, while smoking, and after smoking. In one case a pre-smoking percentage of 0.45 rose to 1 during smoking, and fell to 0.75 five minutes afterward. In another case the respective levels were 0.7, 2 and 1.7 per cent under the same conditions. Thus the increase in the blood carbon monoxide during the act of smoking may amount to double or triple the normal level. Since, therefore, it is essential that the oxyhæmoglobin must at all times be adequate to displace the carboxyhæmoglobin, the liability to accidents in aviation referable to smoking in high altitudes may be visualized.

In view of the phenomenal increase in tobacco consumption in recent years it would seem imperative that the medical profession, especially those in public health work, should give greater attention to the possible morbific effects of an agent which laboratory and clinical research has shown to be so potent.

A field which offers special opportunity for investigation is the possible relationship of tobacco habituation to the rapidly increasing incidence of heart disease, especially the sudden seizures in comparatively young and middle-aged men, attributable to coronary thrombosis. The fact that the increase in fatalities from coronary lesions has consistently paralleled the increase in tobacco consumption may not be without significance. It would appear logical to assume that an agent which has shown a definite relationship to the development of thrombosis in other parts of the body may be a contributory or exciting cause of this affection. There are several cardinal features which seem to be common to coronary thrombosis and thrombo-angiitis obliterans: 1st, the greater susceptibility of the male; 2nd, the presenile age group; 3rd, periodic vasospasm, manifested in the former by anginal attacks and in the latter by intermittent claudication and muscular cramps; 4th, organic vascular changes, having their inception in the latter in the vasa vasorum, leading to progressive impairment of function in the vascular musculature proper, while in the former the initial changes occur in the coronary blood vessels, the anatomical counterpart of the vasa vasorum, with secondary changes in the heart muscle; 5th, thrombotic occlusion, leading to gangrene as a final eventuality in thrombo-angiitis obliterans, and to necrosis and infarction in coronary thrombosis when not intercepted by a fatal termination in the initial seizure; 6th, the two affections are not infrequently concomitant. In reference to such cases Lewis says:[8] "It is to be recognized, too, that in these patients tolerance of exercise may be masked by breathlessness or by anginal pain; this, by limiting the exercise taken, will conceal a weakness of the legs, just as, reversely, a severe intermittent claudication may conceal angina of effort by prohibiting the amount of exercise necessary to induce the latter." If the personal habits of patients with respect to smoking were more carefully noted in clinical records an etiological relationship might more readily be determined.

Relative to the above we quote Levine[7] as follows: "The sex distribution of this disease (coronary thrombosis) is most striking—a ratio of three and one-half males to one female. It is difficult to explain the great frequency of coronary disease in the male. One might ascribe it to the greater amount of physical work that men do, although some might question this and maintain that the humble housewife does just as much work in her home as men do at their occupations. Another factor that may be mentioned is the possible rôle of tobacco. . . At present no satisfactory answer to this question is available, but certainly the consumption of tobacco has been in the past almost entirely confined to men, and has been one of the few acquired differences in habit between the sexes. It is therefore logical to suspect this habit of playing some possible rôle in producing such a male preponderance in susceptibility to this disease. A more definite answer may be apparent before long if the coming generation of women continue the smoking habit that seems to have become so general." With further reference to this subject Aikman says:[1] "It is a well known fact that diseases of the heart and vascular system have increased at an alarming rate in the last few years. Of course the stress of modern life is chiefly blamed, but it seems that there must be some other great etiological factor that works in such a slow and insidious fashion that it is not easily recognized. Is it not possible that the disturbance of circulation which we have seen produced by a very small amount of tobacco, frequently repeated daily for years, may play a greater part in the general increase in circulatory diseases than we realize? Certainly we would hesitate to administer any drug, having as marked effect, over such periods of time." Pertinent also are the words of Baltzan:[2] "We have observed in the acute cardiac catastrophies, interpreted as coronary occlusion, a significant feature. As is well known the incidence of this disease is predominantly in the male. All except one of the persons in whom we have diagnosed this condition, a female, were habitual smokers of tobacco in one form or another."

In conclusion, we quote from an editorial which appeared in the *Journal of the American Medical Association* some years ago.

"The action, then, of tobacco smoke on man is exactly what might be expected from a knowledge of the action of nicotine. While the stimulation stage lasts the blood pressure is raised, then as the nerve cells are depressed the blood pressure falls, this fall being perhaps augmented by the depressing action of the pyridine bases. It can be scarcely doubted that the influence of the rise in blood pressure on the circulatory system can be injurious in some cases. While many persons can and do smoke in moderation without any noticeable effects ever being manifested, there are cases in which an hereditary tendency to arterial disease seems to be seriously accelerated by tobacco. Not only can aortic atheroma be produced experimentally in rabbits by injecting either nicotine or infusions of tobacco or by inhalation of smoke, but not a few cases have been observed in man in which there seems to have been no evident cause for an extensive arteriosclerosis other than excessive smoking."

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Special Articles

THE PÆDIATRIC-PSYCHIATRIC ALLIANCE*

BY LEO KANNER, M.D.

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It is indeed a great honour and at the same time a source of considerable personal satisfaction to be able to take part in the opening of the new psychiatric division of the Hospital for Sick Children. Another practical foundation is being laid for the amalgamation between psychiatry and pædiatrics, a liaison service which has proved itself profitable to the advancement of both of these specialties and, above all, beneficial to the patients and their families.

It is interesting to halt for a while at moments of achievement and take stock of the trends and events which have gradually produced an idea, a wish, an urge, an effort, and finally an attainment. Like the mountain climber who stops from time to time to espy the distant spot in the valley from which he has started, we may be allowed on this occasion to inquire briefly into the tendencies and happenings which might show how the new psychiatric-pædiatric alliance we are celebrating tonight must be viewed as the natural outcome of a dynamic development. This alliance is by no means the result of a chance meeting of strangers, nor an act of reconciliation between alienated relatives; it is the logical conclusion of a progressive approximation of hopes, interests, and actual needs.

Psychiatry, once upon a time, was a gloomy, hopeless, thankless occupation. Its concerns were limited to the extremes and end-products of mental aberrations. To its care were relegated the human wrecks and failures for whom little, if any, hope was held out, beyond intramural custody and protection. While these unfortunates were swaying and stumbling and falling by the wayside, no one made an attempt or knew how to support them, to keep them from falling, to lift them when they had stumbled. They were labeled as are beer bottles, only with much less accuracy; they were diagnosed and classified; their symptoms were studied; a body of knowledge was accumulated about manifestations which then were believed to be part of inevitable disease entities, but the patients themselves could derive little benefit from that knowledge. *There was no such thing as child psychiatry.* Outspoken schizophrenic, manic-depressive, and hysterical reactions were observed very rarely before puberty. Psychiatric occupation with children was limited almost entirely to the low grades of mental deficiency. No attention was paid to the common behaviour problems of boys and girls. Their management was left in the hands of parents, teachers, clergymen, and sometimes the police. They were not looked upon as legitimate objects of medical curiosity. Whipping, scolding, sermons, bad marks at school, and the occasional prescription of tonics and sedatives exhausted the therapeutic resourcefulness available at that time. In the beginning of the twentieth century, significant changes took place in the field of psychiatry.

*An address delivered on the occasion of the official opening of the Department of Psychological Medicine of the Hospital for Sick Children, Toronto, June 23, 1937.

So long as psychotic manifestations were regarded solely as disease entities, with mostly unknown organic pathology, there existed little interest in the early evolution of the patients' personalities. On this continent, Adolf Meyer's formulation of the psychobiological concept of man as a mentally integrated individual shifted the emphasis helpfully from diagnostic terminologies, from mechanical compilations of symptoms, from organs and their diseases to patients as improperly functioning persons. This attitude whetted the appetite for a study of the personality development of the patients, of their abnormal functioning or behaviour, and of their assets which might be used constructively in helping them to overcome their difficulties. Once the habit of dealing with diagnoses had been supplanted by the habit of trying to readjust maladjusted human beings, one no longer was restricted to the interest in those people whose maladjustments had assumed the proportions of full-fledged psychotic collapses. Any person, adult or child, "normal" or "abnormal", who presented any kind of personality or behaviour problem became entitled to psychiatric investigation and treatment. Just as the pædiatric specialist treats a mild common cold as well as pneumonia, so the modern psychiatrist has learned to treat children with fear reactions, temper tantrums or food capriciousness which may be as far from being a forerunner of a psychosis as an ordinary stomach ache may be from being a symptom or forerunner of gastric carcinoma.

This change from almost complete psychiatric neglect of the child to the realization of the great value of child psychiatry was fostered by still another development, which has also originated on this continent. In 1908, Clifford Beers, an energetic and enthusiastic graduate of Yale University, was led by Adolf Meyer to turn to mental hygiene and decided to devote his organizing talent to the betterment and prevention of mental illness. His book, "A Mind That Found Itself", the foundation of the Connecticut Society for Mental Hygiene, and the formation of the National Committee for Mental Hygiene ushered in a movement which has since then assumed international significance. In 1930, the governments of more than fifty countries sent their delegates to the First International Congress of Mental Hygiene held at Washington, D.C. The development of mental illness and delinquency was to be prevented through educational measures and the earliest possible clearing up of personality disorders before hospitalization and penalization would become necessary. This attitude resulted in the desire to reach the individual during the formative years of childhood. In the course of time it was learned that it was not desirable nor wise to think always in terms of future psychoses or criminal careers. Children's behaviour problems came to be considered worthy of psychiatric attention for their own sake, because they existed and called for adequate guidance and not solely because of what might happen later in life.

Meanwhile, pædiatrics has not remained untouched by the new trends in psychiatry. This also is a comparatively recent branch of medicine. For the past half century the science of medical care and prophylaxis in childhood has made admirable progress in many directions. But for a period of time the pædiatrician, proceeding with remarkable speed in the building up and broadening of his specialty, has hardly had the time and opportunity to orient himself in the bewildering mass of new material offered by the psychiatric group, often in a vocabulary for which he was not adequately prepared. But he felt more and more clearly that knowledge of organ pathology and biochemistry, however vital, fundamental, and indispensable, was not sufficient to help to take care of all the problems with which children were brought to his attention. The methods which were so efficient in treating sick hearts, lungs, intestines, and kidneys, the methods which he successfully employed in curing and preventing scarlet fever and diphtheria, failed him altogether when distracted parents brought to him their children because of breathholding spells, temper tantrums, anxiety attacks, persistent thumbsucking, psychogenic vomiting, frequent masturbation, jealousy reactions, stuttering, tics, night terrors, hypochondriacal complaints, antisocial trends, or inability to progress satisfactorily at school. It has been estimated that anywhere from 25 to 55 per cent of all children brought to the pædiatrician's office have difficulties which are rooted in their personalities and in their modes of interpersonal relationships rather than solely in somatic disorders.

The pædiatricians, upon learning that helpful ways of dealing with such problems had been made available, began to wonder how they could incorporate them in their own work with children. They approached the subject with a wholesomely critical attitude. The growth of child psychiatry, like many another growth, was accompanied by "growing pains" which were mistakenly believed to be the essence rather than incidental and curable ailments. Thus, for a time, theoretical controversies, fantastic schemes, weird claims, peculiar terminologies, and unbridled enthusiasms with little content deterred most physicians from the utilization of psychiatric methods when dealing with their patients. Some people in authoritative places acted as if in every instance an elaborate and ceremonious technique were required which could be learned from a selected group of initiated people only and called for a considerable expenditure of time and money. The physicians were rightly disturbed by the spectacle of enthusiastic but medically untrained laymen rushing into the field and taking over some of the functions which the pædiatricians themselves were not quite capable of

assuming. The existing laboratories of child psychiatry, the child-guidance clinics, busy with the enormous task of building a new structure of knowledge and methods, did not have the time and were not equipped to make adequate contacts with pædiatric practice and teaching.

Meanwhile parents began to expect more and more that their pædiatricians display sufficient psychiatric intelligence in dealing with children's behaviour problems. Yet some of the leading pædiatricians were reluctant because their common sense and their scientific outlook revolted against speculations and wrong emphases that went under the name of child psychiatry. This revolt came to a head when, in 1931, Dr. Joseph Brennemann issued a sonorous warning to his pædiatric colleagues against what he called "the menace of psychiatry". But, curiously enough, it was this very warning that did more for a pædiatric-psychiatric alliance than many other efforts, however enthusiastic and welcoming in character. For Dr. Brennemann, in his eloquent appeal, took issue not with psychiatry but with its unskilful over-popularization, with the exclusive use and improper evaluation of certain tests, and with grotesque interpretations of behaviour. His warning in reality was a warning against certain menaces to sound and factual child psychiatry.

Just then, an experiment was begun at the Harriet Lane Home, the Pædiatric Clinic of the Johns Hopkins Hospital. Dr. Edwards A. Park, the director of the clinic, opened the doors of the Harriet Lane Home to a psychiatrist who was to establish his offices in the clinic building and work there together with the pædiatricians. The psychiatrist entered upon his assignment with the clear realization that he came to learn at least as much as to teach. He did not come to create needs artificially, but to study the really existing and felt needs and help to satisfy them to the best of his ability. He regarded his functions as twofold. Aside from an unparalleled opportunity for satisfying investigative curiosities, he envisioned his task as one of helping the patients who were sent to him and at the same time imparting to the pædiatricians the insight and skill necessary for the adequate handling of the common behaviour disorders of children. Together with the pædiatricians, in their own clinic, on their own grounds, and in their own vocabulary, he examines and treats patients who need psychiatric assistance. He and his co-workers are on daily call to the wards and outpatient department where the everyday psychiatric problems of the everyday child are taken up with the interns, with the parents, and with the children themselves. The Harriet Lane interns spend three days a week for a period of two months at the psychiatric division, where cases are assigned to them under supervision and where they acquire an attitude, a knowledge, and a method.

All these arrangements are governed by a spirit of mutual give-and-take collaboration. The psychiatrist has an opportunity to obtain first-hand information about many things which the average child guidance clinic, removed from a pædiatric hospital, has little opportunity to learn. Being placed in the main stream of a busy pædiatric centre, he sees in a constant flow the everyday problems as they come before the practising pædiatrician. He learns of the difficulties that may arise from hospitalization, acute illness, chronic ailments, and convalescence. He observes the problems that face the ward nurses and the social workers of the hospital. He has a chance to study the nature and extent of behaviour disorders of children suffering from asthma, eczema, and spastic colon. He has a chance to follow for years the personality development of premature, rachitic, badly nourished infants, of early ruminators and nystagmoid headshakers, of children with encephalitis, meningitis, epilepsy and lead poisoning.

Just as the child psychiatrist in this manner has an opportunity to become a better child psychiatrist, so does the pædiatrician emerge from this arrangement as a better pædiatrician. He soon learns to slough off some of the current misunderstandings about psychiatry. He learns to humanize his patients. He learns to make himself responsible for human beings, instead of dealing merely with collections of organs of specimens of a supposedly homogeneous species. He learns to consider the fact that some things are problems of one or another organ, others are problems of the child, still others are problems of the family and the environment, and most of them are combinations of several of these. Having learned sets of facts about tissue structures, organ functions and dysfunctions, and biochemistry, the pædiatric intern and medical student get acquainted with other similarly objective and concrete sets of facts about behaviour, performance, the functions and dysfunctions of the individual child, and his reactions to people and life situations. The pædiatricians are helped to develop a curiosity for the whence and why of children's behaviour disorders, and are taught to satisfy this curiosity in a scientific and factual manner. They perceive that the psychiatrist who works with concrete facts can well afford and really manages to refrain from glib toying with hypothetical assumptions of unproved mechanisms and complexes. They are saved from being embarrassed by modern parents who refuse to accept at its face value the assertion that stuttering or nightmares are merely the result of bad tonsils or mild anæmia. Their knowledge of pathology, limited hitherto to body structures, is broadened by the inclusion of the pathology of the acting, feeling and reasoning person. Their knowledge of treatment is broadened by the inclusion of psychotherapy, that is, informed and under-

standing treatment of the person, of the mentally integrated functioning of the individual and the group. Thus, the collaboration between psychiatry and pædiatrics aims to accomplish the following main results:

1. Service to the children who present personality and behaviour difficulties. Service to the children's families who are perplexed by these difficulties. Service to the community agencies working in behalf of children, such as the schools, the relief agencies, the juvenile court, etc.

2. Demonstration of objective, common-sense methods of examination and treatment which the pædiatrician can learn to use in his own practical work when dealing with common, everyday behaviour difficulties of children.

3. Helping the pædiatrician to assume full responsibility for the child as an individual, regardless of whether the child does or does not present behaviour difficulties.

The liaison service at the Harriet Lane Home has passed the experimental stage and become an integral portion of the pædiatric practice and teaching of the clinic. Its wholehearted acceptance by the Harriet Lane group and by the pædiatricians of the country has been a constant source of satisfaction and encouragement. Several of the leading pædiatric hospitals have begun, or are planning, similar arrangements. The Hospital for Sick Children is, to my knowledge, the fourth on the continent and the first in Canada to have brought its plans to a satisfactory realization. The fine preparation, scientific integrity, and excellent personality characteristics of the two men selected for the work give one the assurance that this department will be not only one of the first in chronological order but also one of the foremost from the point of view of service and scientific contributions to the relatively new field of child psychiatry.

A CHILD PSYCHIATRIC CLINIC IN A PÆDIATRIC DEPARTMENT*

BY EDWARDS A. PARK

Baltimore

I shall present the impressions of the pædiatricians of the Harriet Lane Home of the Johns Hopkins Hospital concerning the value of the Behaviour Clinic for Children established there six years ago. What I shall say is of an eminently practical nature, consisting in a summary of our experiences. It will take the form of questions and answers. The answers will be brief, as the limitation of time necessitates.

Is the hospital pædiatrician without special education capable of dealing with children suffering from behaviour disturbances? I reply for myself, that before Dr. Kanner established his clinic and taught us the principles of child psychiatry and procedure I did not understand the behaviour disturbances of children well enough to deal with them, and I have the impression that my colleagues lacked the requisite ability, also. Some pædiatricians, blest with natural interest and aptitude, may become good child psychiatrists without special education, but for most of us teaching is essential. Dr. Abraham Jacobi once said, "The young doctors . . . . may make the same mistakes one hundred times. One hundred mistakes are then called experience". Certainly the teaching of child psychiatry reduces by years the period of learning through trial and error. Child psychiatry can easily be taught to pædiatricians. Dr. Edward Kempf once said to me that symbolism in dreams almost always took visual expression and formed a pictographic language the meaning of which was at once apparent to the experienced. The behaviour disturbances of children in their turn tend to assume certain patterns, and these patterns indicate to those, who know, the kind of disturbance beneath the surface. The important point, however, is that the behaviour of children can be analyzed, rationalized, understood, so that the child can be helped. Pædiatricians are familiar enough with the external manifestations of faulty behaviour, tantrums, lying, stealing, exhibitionism and so forth; they perceive the effects; the trouble is that they do not perceive the underlying causes which may be far removed and hidden away. The tendency of the average pædiatrician, seeing only the external manifestation, is to attempt to quash it. He applies repressive measures which appear successful, but are not, because they do not eradicate the underlying cause. The latter soon vents itself again in abnormal behaviour of the same or some totally new kind.

Of course, a difficulty which confronts the untrained pædiatrician is ignorance how to proceed to examine a child with a behaviour difficulty. Knowledge of technique is just as necessary for successful psychiatric as for neurological examination. But that is easy to acquire. A greater obstacle for the busy hospital pædiatrician is time. Probably no kind of medical work which he may be called upon to do is so time-devouring as thorough psychiatric examination, and in no work is success so proportionate to the time plus pains. It is necessary not only to interview the child but also parents, teachers and others. One must make the child understand himself; one must make all those surrounding the child understand him; and one must also make them understand themselves. More than that, one must win from all conviction and support. Then, in addition, complicated readjustments

*From the Harriet Lane Home of the Johns Hopkins Hospital and the Department of Pædiatrics of the Johns Hopkins University School of Medicine.

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within or outside the home must be effected, and these may demand visits and interviews. Finally, the child cannot be forgotten; he must be kept under supervision as must those in his environment. The busy hospital pædiatrician, single-minded, has not the leisure to do all this, even if he does possess the knowledge and desire.

Can the pædiatrician master child psychiatry? He is capable enough, just as he is capable of developing into an excellent oculist, but as pædiatrician he is already forced to be more or less of a Jack-of-all-trades, and in the case of most of us there is not enough spare time or enough energy left to become an expert in child psychiatry. If mental capacity and time did not circumscribe us, like Faust, we would be masters of all knowledge. The ordinary pædiatrician can, however, acquire enough of the principles of child psychiatry to deal with children having the ordinary behaviour difficulties, just as he can learn enough about diseases of the skin to meet the usual demands from that part of us. Fortunately, child psychiatry is much easier to grasp than adult psychiatry, because the psychological processes of children are, relatively speaking, simple and transparent, and child psychiatry is far easier than adult psychiatry to put into practice. One reason is that the major psychoses of adult life do not exist, or at least very rarely make their appearance, in children, and another, that the activities of the child are less fixed to habitual association routes. Still another reason is that children suffer far more frequently than adults as the result of faulty environmental conditions. Through the act of birth the child is deposited and locked up in an environment in which he remains for years a prisoner. Many children brought to the child psychiatrist because of personality difficulties are healthy-minded persons in open or concealed rebellion against mismanagement. The trained pædiatrician or the child psychiatrist can do a great deal through changing the environment, for example, by educating teachers, parents and others how to adapt to the child's needs, or, on occasion, he can succeed through the substitution of a new environment for the old. Of course, the child psychiatrist can often do much by exerting his energies on the child himself. But the percentage of occasions when he can attain his object by working through the environment is probably far greater in the case of the child than in the case of the adult. The pædiatrician, then, can master enough child psychiatry to deal with the ordinary situations, but he probably must always look for aid to the child psychiatrist when faced with complex problems which require greater psychological insight and experience than he commands and which demand an infinite amount of time and pains.

Why must the pædiatrician know child psychiatry? He holds the strategic position. He is the first trained observer to enter the child's life, the first to detect mistakes in upbringing and education and to perceive unhealthy attitudes or habits. The pædiatrician is the pilot of the formative years, or, better, he is the last perfect example of the family physician, turned to in every trouble, now relying on his medical wisdom, now appearing in the triple part of guide, philosopher and friend. The pædiatrician as guide, philosopher and friend is none other than the child psychiatrist in disguise.

What is the duty of the child psychiatrist in a children's clinic? It is so to organize and develop his work that the great mass of children needing aid can have it. I have psychiatric friends who pride themselves because they confine their work to the intensive study of a few children. Such an attitude may be justifiable from the standpoint of research, but it does not meet the crying human need in a children's clinic such as ours in Baltimore or yours in Toronto. The pædiatrist must somehow manage to take care of all the sick children coming to the dispensary; similarly, the child psychiatrist must manage to care for all those needing psychiatric help. He cannot do this directly—the task is too large. Dr. Kanner estimates that about one child out of ten coming to the Harriet Lane Dispensary presents a problem requiring psychiatric assistance. The psychiatrist of necessity must function not only through the pædiatrician but also at his side. The duty of a psychiatrist in a children's clinic must be, therefore, not only himself to care for the problem children but to teach the pædiatricians to be his assistants and mates. This last is just what the pædiatrician wishes him to do. Finally, his obligation like that of all persons with searching minds must be to gain more knowledge, thereby raising the level of his own work and that of others. Interesting problems present themselves, psychological, social or mixed. The chief one is the main problem of his daily work: How best can asocial trends be overcome or adjusted so that the child may grow up in peace with society, serving some useful purpose; conversely, how can the intelligence and attitude of the community be improved so that the defective and maladjusted child will be protected and given a place in the social scheme? What becomes of these difficult children; are there surface or subterranean connections between the psychiatric disturbances of childhood and the major ones of adult life? From the child can one foretell the man, or perhaps save the man? It is obvious that such questions can only be answered by following, never by trying to penetrate the obscurity of the past. The old proverb, "The child is the father of the man", recognizes that the end is determined by the beginning.

What has the Behaviour Clinic done for the Pædiatric Department? To appreciate its accomplishments, it is necessary to review the situation which existed prior to its establish-

ment. When children came with behaviour difficulties which seemed to be of major importance and to dominate the situation, such as kleptomania, truancy, masturbation, we were in the habit of referring them to the Phipps Psychiatric Clinic, which is not more than 100 yards from the Harriet Lane Home. We could easily have gone with the children to the Phipps Clinic. But, though only a step away, the step took us from our own workshop into a strange one with different methods, different hours, and different peculiarities. Reports came back from the Phipps Clinic concerning patients referred, but they were brief and not satisfactory, certainly, from the standpoint of our education. When the child went to the Phipps Clinic it was, practically speaking, as if he had moved out of town, for we lost sight of him, unless some illness chanced to bring him to us again. When, on the other hand, children came presenting behaviour difficulties which in our eyes were of minor importance, or were mixed with some illness, we kept them in the Harriet Lane. We did not regard the problems involved as of much importance, certainly not enough for a Phipps consultation. Perhaps we gave a few words of advice such as a layman might have volunteered. But the advice was usually poor or inadequate, and was not constructive, for it was not founded on any real insight into the child's needs or appreciation of the necessary action. We did not realize the importance which seemingly small behaviour difficulties might have, and did not feel any particular responsibility.

These minor personality troubles belonged to the parents or teachers rather than to us; our duties lay in the field of disease. Such was our attitude. The result was that these children were almost totally neglected. The creation of the Behaviour Clinic in the Harriet Lane quickly brought this state of affairs to an end. The study and care of the neglected children was rapidly organized and carried out under our eyes and the great hole in our work filled.

But the development of the Behaviour Clinic affected our work in another way, for it at once improved our treatment of defective children. It gave us the benefit of intelligence ratings which were essential for correct grading, and greatly increased the accuracy of prognosis. It furnished expert advice in regard to home care and the directions which education and occupation should take, and it provided expert knowledge and assistance in child placement. I have a friend, a child psychiatrist, who told me that he expected to limit his activities to those children with personality difficulties who were intelligent. I remark merely that the child psychiatrist in a pædiatric clinic can no more conscientiously eliminate the mentally defective child from his sphere of activity than the dispensary pædiatrician can deliberately exclude from his responsibility children with malformations of the heart; defective intelligence and behaviour difficulties are too closely bound together. The child with defective intelligence is subject to behaviour difficulties springing both from without and within. The attitude of society toward the defective child, as toward the epileptic child, is repellent and repressive and creates in him hostile attitudes, and the child himself, because of his defect, lacks the ordinary powers of adjustment.

The care of children with behaviour disturbances and also of defective children in order to be satisfactory requires the employment of the community machinery. In Baltimore as community machinery I refer to the schools, juvenile courts, the Visiting Nurses' Association, and the Family Welfare Association, The Henry Watson Children's Aid Society, the special schools and institutions for defective children, our own Social Service Department, and so forth. The machinery of the community which can be used for its problem children is complicated and uncoordinated. To have its benefits some expert must be available who uses it all the time and hence understands how to employ it. Soon after the inception of the Behaviour Clinic, Dr. Kanner coordinated the community machinery for the care of our difficult children, and put it at the disposal of the Harriet Lane Home.

Of course, with the formation of the Behaviour Clinic the teaching of child psychiatry began. I shall not go into the subject of teaching in detail, but remark merely that Dr. Kanner used both the didactic method and the case system. At first he covered the entire field of child psychiatry by lectures, but after the appearance of his book this no longer became necessary. Since then, in order to impart the requisite knowledge, he has relied on personal contacts with members of the pædiatric staff over their cases. Indeed this case system of instruction has been from the beginning the one of greatest importance. At present the duties of the interns are arranged in such a way that each for a limited period of time is assigned to the Behaviour Clinic where he takes histories, makes examinations under supervision, gives intelligence tests, and acquires a knowledge of the community resources and their use. He goes at least once to the juvenile court, in order to witness its operation and gain a notion concerning its functions. The Behaviour Clinic has placed one of its representatives in the Dispensary so that any intern can have an immediate consultation. If the behaviour problem is within the intern's capacity the child remains in his care. If, on the other hand, it is too complicated, or the proper investigation and provision for the child would be too time-consuming, the case is taken over by Dr. Kanner or an associate, but under those circumstances the intern need not lose sight of the child because the Behaviour Clinic is a part of ourselves and contacts with its staff are so

intimate that the intern is able without effort to follow developments there.

What has the Behaviour Clinic in the Harriet Lane Home done for the Baltimore community? I can answer this question substantially by saying that the Behaviour Clinic has become the centre in the community for teaching and thought concerning the child with behaviour difficulties and is the court of final appeal. It is in process of raising the level of community intelligence and action in regard to children offering social problems. Specifically, the Clinic extends to the various child-caring agencies of the community, such as the relief organizations, placement agencies, and the juvenile court its consultation service for their children who present problems. It has established a close cooperation with the Baltimore schools. The Division of Special Education has for all practical purposes come to use this Clinic as its psychiatric consultation centre. Thus the difficulties of progress in studies, disturbing behaviour at school, irregularity of attendance, problems of the retarded and gifted child, specific reading and other disabilities are referred. The Clinic carries on an educational program within the community, assisting parent-teacher associations and the Child Study Association in their mental hygiene interests and parent education. Frequent contacts through common interest in certain children have resulted in a close collaboration with our reform schools, the State Training School for Feebleminded, orphanages and other institutions in which children are cared for. Mental hygiene clinics held in one of the counties carry psychiatric education into a rural section of the State. Thus the psychiatric clinic of the Harriet Lane Home has come to form an integral factor of the community organizations.

What has been the influence of the Behaviour Clinic on the pædiatric staff? It has made us pædiatricians view the child as a whole, and feel responsibility for him as a living, acting, thinking, feeling being. I once heard it said of a physician that he seemed to think of the patient as a "pair of kidneys between two sheets". We pædiatricians have thought too much of our patients in terms of rheumatic fever or diseased lungs. But the Behaviour Clinic has brought about a changed attitude and made us ask ourselves if we have done all within our power to safeguard mental health.

What is the attitude of the pædiatric staff of the Harriet Lane toward the Behaviour Clinic? The attitude is best expressed in a letter written me by a former intern. I give it, although it has already been published.

Intern A:

"The more that I see and add to my very limited knowledge of pædiatrics, the more I am convinced that psychiatry is not merely an adjunct but a fundamental component of that specialty.

"The value of an intramural psychiatric clinic depends entirely upon the manner in which it is conducted. If arranged properly, then its value is considerable; if supervised poorly, its value is negligible.

"The benefits to medical staff, patient, and psychiatrist depend on the intimacy of contact and degree of confidence existing between the two physicians supervising the case.

"To the intern, knowing personally the man to whom you might refer a case, feeling quite at liberty to discuss the situation, or at least to read a thorough case report, in your own case is of incalculable value, first, in adding to your own knowledge; second, in treatment of the patient; third, in promoting a greater interest in psychiatric or behaviouristic aspects of problems that present themselves.

"On the other hand, it is usually quite unsatisfactory when it is necessary to rely upon an independent isolated department. The records are apart, there is reduplication of much work, the impression of the psychiatrist is rarely discovered, and interest naturally wanes.

"In my opinion the psychiatrist probably experiences the same reaction. The patient naturally benefits by this coordination of effort. Cooperation and confidence are the keynote to the success, I believe, of the intramural clinic. Specific examples are numerous, but not sufficiently well defined in my mind for me to cite."

Where must a Behaviour Clinic for children be placed in order that it may have the greatest influence and usefulness?

It must be placed in a main stream of child life, preferably in a main stream of sick children; in other words, it is best located in a children's hospital. Illness and behaviour disturbances are confused. Children are sent to hospitals because of physical illness when the actual difficulty is psychological; abnormal behaviour may be the only external evidence of disease; illness brings out behaviour disturbances. Sickness and behaviour disturbances are too intimately connected with each other physiologically for either to be dealt with separately. If the Behaviour Clinic were outside the children's hospital there would be a repetition of the unsatisfactory situation which existed before the creation of a behaviour clinic in the Harriet Lane Home; children especially in need would not reach it; only those children supposedly suffering from major difficulties would be sent to it.

Then, too, children showing apparently trivial behaviour difficulties may be the ones most in need of assistance, and what seems trivial may be actually of major potentiality. It is in the adjustment of minor everyday difficulties that the child psychiatrist or pædiatrician exerts the greatest usefulness. Temper tantrums, bed wetting, vomiting of a functional nature, failure at school, failure to get on with other children, disobedience, exhibitionism, breath holding, etc., all belong to the child psychiatrist or pædiatrician. They are the conditions which commonly bring child and parents to the pædiatrician for aid; they are seen on every side in the patients thronging children's dispensaries.

Can the pædiatrician get along without the child psychiatrist or the child psychiatrist without the pædiatrician? Each has gotten along without the other in the past, but at the expense of how much poor work and work only partly done!

If the pædiatrician cannot see clearly without the psychiatrist, the psychiatrist is even more blinded without the pædiatrician. Since organic and psychogenic factors are so intermingled it is plain that the pædiatrician and the child psychiatrist must work together, each supplementing the knowledge and experience of the other. That is the only way by which complete results can be attained.

The Clinic for Psychological Medicine established at the Sick Children's Hospital will be a boon to many individuals, children, parents and teachers in need of psychiatric assistance or advice. It will be a free gift to pædiatricians and students, because it will impart a new knowledge and outlook and will open a new field of usefulness and development. Its inauguration is an auspicious event to the City of Toronto, especially to those civic organizations and institutions concerned with the welfare of children, because it marks the establishment of a centre of learning and education, a place of expert advice, a clearing house, a court of final appeal whenever questions arise involving maladjusted and defective children. Gradually its influence will become diffused and will raise the level of intelligence with which badly adjusted children are dealt with in the courts, the schools, orphan asylums as well as in private homes, and will substitute for neglect and repression a spirit of sympathetic understanding and friendly aid. Finally, the creation of the Clinic for Psychological Medicine is an event of importance in Canada, because from it other clinics of a similar kind are bound to spring in distant places, and men and women trained in it, whether going out as pædiatricians or full-fledged child psychiatrists, will begin to take their places and exercise their enlightening influence in its various communities.

Association Notes

The Annual Meeting in 1938

Without a doubt Geoffrey Chaucer was right! When the snows of winter have disappeared; when the birds sing again; when the leaves appear and the buds break; in the words of that first "sweet singer" in the English Tongue, "than longen folks to goon on pilgrimages". Nowadays we say, "It is time to take a trip!"

Our grandfathers and grandmothers had another name for this springtime restlessness. They called it "Spring Fever", and, to clear away any idea of straying far from the paternal rooftree, all the young folk were liberally dosed with sulphur and molasses. The means of travel in those days were not, of course, very far ahead of those enjoyed by Chaucer on his trip to Canterbury, and not half so romantic. The journey from Toronto to Halifax was not a thing to be lightly undertaken. It was not made on a streamlined, air-conditioned train, or in a limousine rolling swiftly over paved highways, as you will make it next June. It will not even approach Chaucer's pilgrimage in point of time or difficulty. At its end a genuine Nova Scotia Welcome awaits you and your families and friends. While you participate in the rites of Æsculapius, they can have a jolly time, and be your guides when your duties permit you to enjoy our city and province.

Part of the enjoyment of any pilgrimage comes from the tales you hear. There are stories of the hospital, the clinic, and the consulting room to be told and enjoyed. With due regard to the learned discourses of the lecture hall, some of the most valuable professional hints are picked up in the little, informal discussions held after the meetings or in the dining halls. There are accounts to be heard of new, original work; of advances in clinical medicine and surgery; of the progress of medicine in its relation to society. Then too there is the renewal of old friendships: Jones meets Smith for the first time since they left Old McGill, Old Toronto, Old Queen's, or Old Alma Mater, thirty years ago. 'Tis then you hear "the laughter not unmixed with tears", as old scenes, old faces, and youthful escapades are recalled. All these make up a good medical meeting. But we of Nova Scotia have tales of our own to tell. Each little indentation in the long coastline has its story of storm and distress mixed with sunshine and laughter. Life moves slowly and serenely, tempered with a philosophy with which we hope you will become acquainted and remain to enjoy. During the months to come we hope to tell you something of this, of the people who are imbued with it, and the places where they live and practice it.

In the past three centuries Nova Scotia has welcomed to its shores pioneer settlers from France, England, Ireland, Germany, Scotland, and the New England colonies. Though these have mixed sufficiently to adhere closely in harmony, yet each has retained to a degree characteristics of the original group. The descendents of the French are found in Digby, Yarmouth, Richmond, and Antigonish Counties. Those of the German settlers are mainly in the County of Lunenburg. The Scottish Highlanders settled in Pictou, Antigonish, and the counties making up Cape Breton Island. Halifax and Hants were the outposts of England; the New Englanders are here and there; while the Irish, God save them! are everywhere. So it matters little from whence sprang your roots, this Old Province has a bit of the old trunk for you to study and enjoy.

By this time I know an old Highlander just this side of the foothills of the Rockies is shutting his eyes, breathing in deep lungfulls of

the salt seaweed laden air, and smacking his lips in remembrance of the oatmeal porridge made from this year's grist at Robert Grant's Mill. Still farther, in British Columbia, a lad longs for some Tancook sauerkraut, and to see the ships go out in the dim mists of morning. You have been away from home a long time. Come back to see it once again next June, all you exiled sons and daughters of New Scotland.

But whisht! I fear I have wandered far from Geoffrey Chaucer. You remember he sought shelter at the Tabard Inn at Southwark. Freed of romance it was no doubt a "dump" according to our ideals. It is our belief that with the largest meeting of the Canadian Medical Association possible in Halifax next June, there will be an ample amount of good hotel accommodation. The Nova Scotian Hotel, owned and operated by the Canadian National Railway, will be our headquarters and the place where all meetings will be held. Nearby are other hotels, each of which is setting aside a number of rooms for guests at this meeting in anticipation of reservations. A list of these is given below with the number of rooms guaranteed us, and rates. Besides there are a number of residential hotels, and if necessary University Residences may be secured, so all will be comfortably cared for. *But Secure Your Reservations Early* if you wish to avoid confusion and delay. Write to the hotel of your choice direct, and it will confirm your reservation. If booked up, your reservation will be made at the next best choice by the Housing Committee. Make your mind up to attend now, and write today for reservations.

Nova Scotian, 100 double rooms, rates $5.00 and $6.00.
Lord Nelson, 100 double rooms, rates $3.00, $5.00, and up.
Carleton, 25 rooms, rates $1.50, $3.00, and up.
Halifax, 75 rooms, rates $2.00, $3.50, and up.
Queen, 75 rooms, rates $1.50, $2.50, and up.
Moderate rates at Hillside Hall, The Waverley, and Haliburton Inn also.

Now, a Very Happy New Year to all members of the Canadian Medical Association from your Brethren in Halifax.

The Executive Committee

The Executive Committee of the Canadian Medical Association met in the Chateau Laurier, Ottawa, on October 28th and 29th, with every member of the Committee present. During the busy two-day session a great many matters received attention, among which were the following.

FEDERATION

Some time before the meeting each member of the Executive Committee was sent a draft of the proposed Constitution and By-Laws for Divisions, with the request that he study it carefully and come to the meeting prepared to discuss it. At the meeting, a number of suggested changes were finally approved, after which it was agreed that the Committee on Constitution and By-Laws should be asked to study the plan as amended and report to the Executive Committee and the General Council. This whole matter will be fully discussed at the meeting of the General Council in Halifax next June.

CANADIAN MEDICAL ASSOCIATION: QUEBEC DIVISION

At the annual meeting in Ottawa last June it was announced that a new Medical Association was being organized in the Province of Quebec. This new Association now applied for recognition as the Quebec Branch of the Canadian Medical Association. This being granted, representatives of the Quebec Branch requested that the Quebec Branch of the Canadian Medical Association should now be recognized as the Canadian Medical Association: Quebec Division, in accordance with provisions of the Canadian Medical Association By-Laws for Divisions. A resolution was passed to this effect, and this new Division of the Canadian Medical Association was officially launched. The officers of the Quebec Division are prepared to bring their full membership into the Canadian Medical Association, collecting the conjoint membership fee locally and forwarding to the national treasury $8.00 for each member of the Division. There are now in the Canadian Medical Association two Divisions, namely, the Canadian Medical Association: Alberta Division and the Canadian Medical Association: Quebec Division.

CANADIAN SOCIETY FOR THE CONTROL OF CANCER

At the last annual meeting the Study Committee on Cancer was instructed to proceed with the organization of a Canadian Society for the Control of Cancer and a Department of Cancer Control in the Canadian Medical Association. Since that time Dr. J. S. McEachern, the Chairman of that Committee, has made a tour of Canada, discussing in the various provinces the formation of a Canadian Society for the Control of Cancer. He has set up a Provisional Board of Directors for this Society, composed of the following, Drs. J. S. McEachern (Chairman), W. E. Gallie, Geo. S. Young, Mr. Napier Moore, Mr. F. K. Morrow, Mr. E. S. Macfarlane, and the General Secretary. This Provisional Board has met on three occasions and reports progress with respect to the organization of the Society. It is expected that the Society will have Branches in each of the nine provinces. It is the intention of the Society to deal with and through the Chairmen of the Provincial Cancer Committees, and it will be left to these local men to arrange to have set up in their respective provinces a Provincial Branch of the Society

and to ask outstanding individuals whom they may select to associate themselves with the project. With regard to finances, it has been suggested as a tentative arrangement that 75 per cent of all money collected remain with the province and 25 per cent be paid over to the National Society, excepting where benefactors stipulate otherwise. This arrangement is subject to change at the end of the first year of operation. The Society will undertake a plan of lay education, involving the press, moving pictures, radio broadcasting, etc. It is proposed that the Society shall have a Grand Council of eighteen men, two from each province, one of whom shall be a doctor and the other a layman. The Grand Council, which will be the supreme body in the National Society, will have the right to select not more than five additional members to their body, making a total of twenty-three.

Organization of the Department of Cancer Control

A Department of Cancer Control is being set up within the Association according to the plan approved by Council at the last annual meeting. A Board of Directors is being organized, consisting of a local nucleus on which the following have consented to act: Drs. T. C. Routley, Chairman, Geo. S. Young, Roscoe Graham, R. I. Harris, and William A. Scott, along with one representative from each province, whose names will be announced shortly.

The Department of Cancer Control received definite instructions from the General Council of the Canadian Medical Association to endeavour to set up in every hospital of 100 beds or over a study group on cancer and to carry out a program of medical and lay education.

An Authorship Committee has been set up under the chairmanship of Dr. Roscoe Graham. This Committee is now engaged in the preparation of a book dealing with cancer in every site. As soon as the different chapters have been prepared they will be sent for approval to the Dean of the Medical Faculty of each University, to be referred by him to the different departmental heads for criticism. When finally completed the book will be sent to every member of the Association.

Draft lectures will be prepared for lecturers if desired. It is urged that cancer be given a prominent place in all medical society programs. Newspaper articles are also being prepared for publication.

To finance its operations, the Department of Cancer Control has received an annual grant of $14,000 from the Board of Trustees of the King George V Silver Jubilee Cancer Fund for Canada.

Pasteurization of Milk

At the annual meeting in Ottawa, it was recommended to the General Council that the Association take some active steps towards intensifying the campaign which is being carried on across Canada with respect to compulsory pasteurization of milk which is sold to the public. Since that time reports have been secured from the different provinces indicating the extent to which pasteurization of milk is compulsory in the different provinces. After studying the replies received from the provinces, the problem was passed to the Committee on Public Health for study and report, in an endeavour to ascertain what further steps the Association should take in an effort to achieve the desired result.

The Rowell Commission

The following resolution was presented to the Executive Committee for consideration by the Committee on Economics.

That whereas a Royal Commission has been appointed by the Federal Government and will shortly commence investigating the relationships between the Federal Government and the Governments of the various provinces as applied, among other things, to Social Services;

AND WHEREAS the Commission will probably study the question of the care of the indigent and the unemployed;

AND WHEREAS the medical care of the indigent, the unemployed, and the low wage earner is a question vitally affecting these classes of the people and the medical profession;

AND WHEREAS The Canadian Medical Association has gone on record as favouring the appointment of a Royal Commission to study the question of a Federal Health Insurance Scheme;

BE IT RESOLVED that the nucleus of the Committee on Economics recommends to the Executive—

1. That a watching brief be held by the Association on all proceedings of the Commission through its General Secretary, Dr. T. C. Routley, being present at the sittings;

2. That, if and when questions concerning the medical care and health of the people of Canada arise, The Canadian Medical Association be prepared to present the views of organized medicine in Canada, if such be deemed a wise course of action;

3. That the nucleus of the Committee on Economics is in favour of federal participation in any health insurance scheme introduced into any province.

After careful consideration of this whole matter, the following resolution was approved by the Executive Committee:

That we respectfully request the Rowell Commission to explore fully the question of a federal scheme of health insurance in order that a body of information may be obtained that would be of value to any government in Canada that might intend to enact legislation on health insurance;

Also that the whole question of medical care of indigents be carefully considered, with a view to placing the medical care of indigents on the same footing as the provision of food, clothing, fuel and shelter.

AND WHEREAS the federal government has already charged itself with certain matters concerning health,

such as medical care of mariners and Indians, quarantine, medical examination of immigrants and supervision of food, drugs, proprietary medicines and narcotics, health of animals and transmission of diseases from animals to man; and WHEREAS the Federal Department of Health might properly extend its field of activity to deal with the health and sanitary problems arising out of modern methods of transportation, such as by automobile and aeroplane;

AND WHEREAS other public health problems of national distribution and importance such as cancer, tuberculosis, mental hygiene, maternal welfare, child welfare, and venereal disease, form a most important part of the activities of the Federal Department of Health;

THEREFORE BE IT RESOLVED that we respectfully suggest that the British North America Act be amended where necessary so as to give the Federal Government more extensive jurisdiction in public health matters of national importance;

ALSO BE IT RESOLVED that the Canadian Medical Association stand ready, upon request, to place at the disposal of the Rowell Commission any information or assistance within its power.

The Chairman of Council and the General Secretary were then instructed to draw up a memorandum to be presented to the Rowell Commission; and the General Secretary was instructed to hold a listening brief in all the deliberations of the Rowell Commission.

MEMBERSHIP

One year ago an agreement was entered into between the Ontario Medical Association and the Canadian Medical Association, also between the Medical Society of Nova Scotia and the Canadian Medical Association, by which arrangements were made for a conjoint membership fee in the provincial medical association and the national association, collections to be made by the provincial association and $8.00 per member forwarded to the Canadian Medical Association. At the request of the two provincial associations mentioned above, the Executive Committee agreed that a similar plan should be operated for the year 1938.

SCHOOLS FOR LABORATORY TECHNICIANS

At the last annual meeting a committee was appointed under the chairmanship of Dr. W. J. Deadman, of Hamilton, to study the question of training and registration of laboratory technicians in Canada. This committee is undertaking the following studies:

1. The present methods of training pathological, bacteriological and biochemical technicians in Canada.
2. The qualifications and ability of the technicians now employed as such in Canada.
3. The desirability or otherwise of having standards for the recognition of schools or laboratories for the training of laboratory technicians.
4. The recognition or creation of a register of technicians for the guidance of smaller hospitals and doctors desirous of assurance of capability on the part of those making application, particularly those living at a distance.

This Committee will present its report at a later date.

THE JOURNAL

In the report of the Editor of the *Journal* attention was called to a number of papers published recently in the *Journal*, which are deserving of special mention, such as "The prevention of silicosis" by Denny, Robson and Irwin; "The use of protamine zinc insulin in diabetic coma" by Rabinowitch, Fowler and Bensley; "The relation between hormones and cancer" by Prof. A. Lacassagne, of Paris. The first of these papers has attracted widespread attention.

It was pointed out that it has been necessary, from an economic standpoint, to curtail the size of the *Journal* as much as possible without in any way lowering its standard, and, with this end in view, the editorial department has paid special attention to careful editing and to the limitation and grouping of illustrations.

It was suggested that, with due regard to the necessity for conserving space in the *Journal*, a special effort should be made to include in each issue something on therapeutics which would be of particular interest to the general practitioner.

INTERNATIONAL HOSPITAL ASSOCIATION

It was reported that the International Hospital Association which met in Paris, in July, 1937, at that time decided that the next convention of the Association would be held in Toronto in 1939. The American Hospital Association and the Canadian Hospital Council will meet in Toronto at the same time. It is expected that this will be the greatest hospital convention ever held in this country, and probably the greatest ever held on this continent.

NATIONAL RESEARCH COUNCIL

Almost a year ago a subcommittee of the Executive Committee was appointed to study and report upon the suggestion which had come to the Canadian Medical Association from the President of the National Research Council that an Associate Medical Research Committee be established. This matter was considered at the annual meeting in Ottawa last June, after which a resolution was passed expressing approval of the formation of such a committee under the ægis of the National Research Council and suggesting that a conference of representatives of interested bodies, *viz.*, Faculties of Medicine, Medical Research Institutions apart from medical schools, Dominion and Provincial Departments of Health, and nationally organized medical associations, *i.e.*, Canadian Medical Association and Royal College of Physicians and Surgeons of Canada, should be held for the purpose of nominating to the National Research Council the personnel of the Associate Committee on Medical Research and to outline the scope of its duties and responsibilities. A

conference of the organizations mentioned was held on October 28th in Ottawa, when arrangements were made to set up an Associate Committee on Medical Research, as suggested.

COMMITTEE ON NUTRITION

A suggestion was made to the Executive Committee by the Committee on Nutrition that authority be given them to arrange for outstanding speakers to be brought to Canada during the winter for the purpose of addressing meetings on the subject of nutrition. The Executive Committee approved this recommendation.

RADIO BROADCASTING

The attention of the Executive Committee was called to the new regulations affecting radio broadcasting, which came into effect on November 1, 1937, Section 7 of which reads as follows:

> "No one shall broadcast . . . (1) upon the subject of venereal disease, or other subjects relating to public health which the Corporation may, from time to time, designate unless such subjects be presented in a manner and at a time approved by the General Manager as appropriate to the medium of broadcasting."

It was suggested by the Radio Broadcasting Corporation that the Canadian Medical Association might deem it advisable to have cancer specifically mentioned as one of the "other subjects relating to public health" which might be designated as requiring special permission before any broadcast is made relating thereto. This suggestion was unanimously approved by the Executive Committee.

THE HALIFAX MEETING

Arrangements are well under way for the annual meeting which is to be held in Halifax, N.S. during the week of June 20th next. It is hoped that two prominent British speakers will be present. Information will be published in the *Journal* from month to month in further reference to the program and other arrangements for the meeting.

Federation

There are few if any in the profession who, with conviction, will argue against the value of medical organization. There are, of course, many who do not belong to any medical society but one is unfamiliar with any sound arguments which these persons have advanced in support of their self-imposed professional isolation. Indifference, inertia, selfishness, lack of desire to cooperate with others, mental obliquity, egotism—these and many other reasons can be advanced, but, in the final analysis, these same outsiders always look to someone or something to solve the medico-sociological problems which impinge upon their lives.

Medical organization, to be really effective, must begin with the individual and his immediate colleagues. That is why the local medical society very properly claims first allegiance on the part of the profession. If this local organization could meet all the corporate needs of the profession there would be no necessity for anything further, but experience has taught us that such is not the case. Problems which break through the local horizon and the provincial horizon have brought home to us very clearly that, in our own interests we require medical organization which, like Gaul, can be divided into three parts,—local, provincial, and national. And today in Canada we face many situations which give thoughtful men a deep sense of the need of a closely knit profession, capable of meeting any situation which may arise in any part of our far-flung land.

We need a virile, flexible, national Association, thoroughly representative of Canada as a whole.

We need just such an organization as Federation makes provision for—not only now—but in the future.

We need a Canadian Medical Association of such strength that, not only we in the profession but the citizens of Canada as a whole will look upon it as representing the best thought and opinion and influence of which the profession is capable. It is not further argument we need to build up a case for ourselves. The case is built up. It is man power we need to complete the structures. But while the general trend of thought appears to be favourable to Federation, inquiring minds ask, and one feels reasonably so, what are the advantages of Federation?

What are the advantages of any army corps over the same number of soldiers enlisted in several independent units? An army corps has every reason to act as a unit. It has one common objective, a definite goal, a problem to solve that requires the unification of forces and brains and equipment and the main chance may be irretrievably lost if efforts of available forces are uncoordinated, independent and sporadic. Battalions, of course, can and do win victories but they require to be flanked every step of the way by other battalions if ground gained is to be consolidated and kept.

We in Medicine in Canada should be an army corps. What other vocation has a common problem, objective and answer? Laws in the several provinces differ; industry has problems peculiar to the area; finance—taxation—education—social problems, all are subject to variation and differing legislation and interpretation. But, health, disease, the art and science of medicine are exactly the same in Halifax as in Vancouver, and all the way in between. Medi-

cine has a common problem. 'Tis true that the battalions of medicine, local and provincial, can and do accomplish much, but it is equally true that much more can be accomplished if we consolidate our position moving forward as a great national organization.

Federation means that every provincial medical association is supported by and supporting the efforts of every other province. Federation means more members. More members mean more strength, moral and financial, and that means more power to accomplish our objectives. Federation says to the doctors and to the public of Canada that the medical profession is one united body. What other way can we manifest solidarity within the profession?

The Canadian Medical Association, because it is national, has attracted to itself gift funds exceeding 400 thousand dollars. What have the provincial associations, working independently, all put together, received in a similar way? And Federation, making us just so much stronger nationally, can no doubt pave the way for still greater public confidence and support.

Federation says to the Parliaments of Canada, both Federal and Provincial, that legislation which is proposed interests all the doctors. It doesn't follow that Nova Scotia doctors will tell British Columbia doctors how to solve their legislative problems—each province, of course, is autonomous—but Federation does tell Nova Scotia and British Columbia and all other provincial governments that, in spirit, they are dealing with a united medical profession. When Scotland, and Northern Ireland, and Wales, and England talk to their local governments—they talk as the British Medical Association, speaking through the local profession of course, but speaking with force and influence which apparently serves the profession well in the Motherland.

In the event of the plan under consideration being acceptable to the Canadian Medical Association and the Provincial Medical Association, Federation will impose no unwarranted obligation upon any Association or individual. By paying the Divisional fee, the practitioner will become a member of that Division of the Canadian Medical Association. If he so chooses, he may become a member of the national body by paying the additional fee required to maintain the national organization.

Federation makes possible a lower national fee because it is confidently believed that Federation will greatly increase the number who will be willing to go beyond the provincial boundaries in their support of organized medicine.

Federation places the profession in a stronger position to speak with conviction and authority to all other groups in society on any and all problems which are of mutual interest and concern.

Federation makes no demands upon its component parts, the Divisions, which in any sense obligate them financially, nor does Federation interfere with the complete autonomy of a Division with respect to its own affairs.

Federation presents to the medical profession of Canada an opportunity for national organization along lines which must appeal to all nationally-minded citizens—and Canada needs more national thinking and acting if we are going to find our rightful place in the community of nations.

Federation gives each Division the right to appoint its representatives to Council.

Federation is the answer to the physician who says we have too many medical organizations. We cannot afford to be without the local society and the national body. Where then can we re-align our organizations? Federation is the answer.

Federation offers the distinct advantage of pooling ideas and problems which today are paramount in one province but which tomorrow may assume most important proportions in another province.

Federation after three years of study from coast to coast has failed to elicit any sound arguments against it.

Federation is a forward step and appears to have everything to commend it.

The success of the conjoint fee in Ontario and Nova Scotia (only two provinces which have tried it as yet) has been overwhelmingly successful and surely may be taken as an expression of opinion in favour of Federation. —From the *Bull. Ont. Med. Ass.*, 1937, **4**: 120.

Hospital Service Department Notes

New X-ray Therapy Department at the Winnipeg General Hospital

The installation of a new high-voltage x-ray therapy apparatus has just been completed at the Winnipeg General Hospital. During the next few days preliminary tests and standardization work, necessary for accurate measurements of the radiation from this powerful apparatus, will be carried on. After the completion of this essential work the apparatus will be ready for the treatment of deep seated malignant tumours. This new department was made possible by the generosity of Mr. John

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, 184 College Street, Toronto.

Approved General Hospitals

Name of Hospital	Location	Bed Capacity (excluding bassinets)	Distribution of Beds						Intern Service							
			Medical	Surgical and Gynecological	Obstetrical	Pædiatric	Communicable Diseases including Tuberculosis	Other Departments	Number of Interns excluding residents	Women Interns Accepted	Examination or Appointment	When Selected	Internship Begins	Salary Paid (first year)	Rotation or Straight
Victoria General	Halifax	252	48	101	—	15	4 C.D.	74	12 u.g.	No	Ex.	May 12th	May 15th	Yes	Rotation
Saint John General	Saint John	354	43 pb.	80 pb.	52	39	28 C.D.	112	6 g. +3 u.g.	Yes	App.	Prev. fall	July 1st	Yes	Rotation
St. Sacrament	Quebec	275	100 pb.	100 pb.	20	55	—	—	2 g. +7 u.g.	Yes	App.	May & June	July 1st	Yes	Rotation
Hotel Dieu de Quebec	Quebec	350	50 pb.	102 pb.	—	—	—	198	4 g. +5 u.g.	No	App.	Mar. or Apr.	July 1st	Yes	Both
Jeffrey Hale's	Quebec	145	35	35	17	12	20 C.D. +16 Tbc.	10	2 g.	No	App.	January	July 1st	Yes	Rotation
Children's Memorial	Montreal	330	187 pb.	55 pb.	—	Yes	44 Tbc.	36 orthop.	13 g.	2	App.	Dec. 15th	July 1st	No	Rotation
Notre Dame	Montreal	671	107 pb.	126 +44 gyn.	29	64	—	301	15 g. +20 u.g.	Yes	App.	March	June 15th	Yes	Both
Ste. Justine	Montreal	500	99 pb.	117	33	460	60 C.D.	Yes	4 g. +13 u.g.	2	App.	Feb. & July	June 15th	No	Rotation
St. Joseph	Montreal	350	90 pb.	100 pb.	—	—	—	36 urol. +124	7 g. +12 u.g.	No	App.	June	June	No	Rotation
Ste. Luc	Montreal	400	110 pb.	110 +10 gyn.	36	70	—	64	12 g. +12 u.g.	No	App.	January	July	Yes	Rotation
Jewish General	Montreal	185	Yes	Yes	38	26	—	121	13 g.	No	App.	February	July	Yes	Rotation
Montreal General	Montreal	600	88 pb.	205	—	24	—	283	48 g.	Yes	App.	December	July	No	Rotation
Royal Victoria	Montreal	709	79 pb.	136 pb.	214	30	—	250	50 g. +1 dent.	No	App.	January	July	No	Straight
St. Mary's	Montreal	211	Yes	Yes	25	24	—	—	9 g. +1 u.g.	No	App.	February	July	No	Both
Ottawa Civic	Ottawa	540	52-75 pb.	125-200 pb.	90	80	—	20-30 E.E.N.T.	17 g.	No	App.	January	July 1st	Yes	Both
Ottawa General	Ottawa	321	24 pb.	67 pb.	17	60	7 C.D.	12 E.E.N.T. +134	9 g.	No	App.	February	July	Yes	Rotation
Kingston General	Kingston	375	48 pb.	40 pb.	26	43	36 Tbc. +22 C.D.	20 urol. +20 E.E.N.T. +121	10 g. +1 dent.	No	App.	January	June	Yes	Rotation
Hosp. for Sick Children	Toronto	420	Yes	Surgical	—	420	—	—	20 g. +20 u.g.	Yes	App.	January	July 1st	No	Rotation
St. Joseph's	Toronto	333	98 pb.	120 pb.	38	—	—	77	11 g. +2 u.g.	2	App.	December	July 1st	No	Rotation
St. Michael's	Toronto	556	104 pb.	205 pb.	57	—	26 Tbc.	392	28 g.	Yes	App.	December	July 1st	No	Rotation
Toronto East General	Toronto	145	35 pb.	43 pb.	28	—	—	39	5 g. +1 u.g.	No	App.	April	July 1st	Yes	Rotation
Toronto General	Toronto	1118	243 pb.	331 pb.	111	—	20 Tbc.	413	47 g.	Yes	App.	December	July	No	Both
Toronto Western	Toronto	495	120 pb.	120 pb.	72	—	—	Yes	24 g. +4 u.g.	No	App.	December	July 1st	Yes	Rotation
Mount Sinai	Toronto	82	Yes	Yes	20	5	Yes	Yes	4 g.	Yes	App.	December	July 1st	Yes	Rotation
Women's College	Toronto	140	17 pb.	15 pb.	44	—	—	Yes	7 g.	All	App.	January	July 1st	No	Rotation
Hamilton General	Hamilton	618	90 pb.	119 pb.	77	78	94 C.D.	160	23 gr.	No	App.	December	July 1st	Yes	Rotation
Brantford General	Brantford	184	36 pb.	36 pb.	20	34	20 C.D.	38	2 g.	No	App.	December	July 1st	Yes	Rotation
St. Joseph's	London	263	23 pb.	26 pb.	47	51	—	25 E.E.N.T.	5 g. +1 u.g.	Yes	App.	Jan. 15th	July 1st	Yes	Rotation
Victoria General	London	400	90 pb.	60 pb.	44	80	22 C.D.	25 E.E.N.T. +79	12 g.	Yes	App.	December	July 1st	Yes	Rotation
Metropolitan General	Windsor	126	66 with S.	Yes	29	20	10 Tbc. +C.D.	Yes	3 g.	Yes	App.	January	July 1st	Yes	Rotation
St. Joseph's	Windsor	113	Yes	Yes	32	17	—	—	3 g.	No	App.	November	July 1st	No	Rotation
Children's	Winnipeg	121	Yes	Yes	—	121	—	—	4 g. +3 u.g.	2	App.	January	June 1st	Yes	Rotation
Winnipeg General	Winnipeg	596	160 pb.	129 pb.	39	18	—	250	10 g. +17 u.g.	2	App.	December	July 1st	No	Rotation
Misericordia	Winnipeg	185	Yes	Yes	40	10	—	Yes	2 g. +4 u.g.	No	App.	Nov. or Dec.	June 1st	Yes	Rotation
St. Boniface General	St. Boniface	444	101 pb.	152 pb.	44	50	—	32 E.E.N.T. +25 urol.	6 g. +15 u.g.	1	App.	December	June	Yes	Rotation
Regina General	Regina	408	63 pb.	94 pb.	37	35	20 Tbc. +31 C.D.	128	7 g. +3 u.g.	No	App.	January	July 1st	Yes	Rotation
Grey Nuns'	Regina	204	25 pb.	49 pb.	30	30	5 C.D. +10 Tbc.	27 E.E.N.T.	3 g.	No	App.	January	July 1st	No	Rotation
St. Paul's	Saskatoon	234	50 pb.	98 pb.	20	20	6 Tbc. +20 C.D.	20 urol.	3 g. +2 u.g.	1	App.	January	July 1st	Yes	Rotation
Saskatoon City	Saskatoon	311	134 with S.	Yes	22	32	29 C.D.	10 urol.	10 g.	2	App.	December	July 1st	Yes	Rotation
Edmonton General	Edmonton	223	102 with S.	Yes	18	38	65 Tbc.	—	2 g. +3 u.g.	No	App.	Jan. & Oct.	Jan. & May	Yes	Rotation
Misericordia	Edmonton	185	26 pb.	37 pb.	28	23	—	Yes	3 g. +4 u.g.	No	App.	January	July 1st	Yes	Rotation
Royal Alexandra	Edmonton	460	90 pb.	90 pb.	50	50	37 Tbc. +63 C.D.	Yes	10 g. +7 u.g.	No	App.	January	May & July 1st	Yes	Rotation
University of Alberta	Edmonton	335	91 pb.	105 pb.	17	52	20 Tbc.	10 urol.	13 g. +5 u.g.	Yes	App.	December	July 1st	Yes	Rotation
St. Paul's	Vancouver	345	Yes	Yes	35	20	—	Yes	5 g.	No	App.	Dec. & Jan.	July 1st	Yes	Rotation
Vancouver General	Vancouver	1167	117 pb.	234 pb.	110	105	121 Tbc. +94 C.D.	Yes	39 g.	Yes	App.	Nov. & Dec.	July 1st	Yes	Rotation
Provincial Royal Jubilee	Victoria	388	159 pb.	117 pb.	40	31	42 Tbc. +15 C.D.	Yes	9 g.	No	App.	November	July 1st	Yes	Both
St. Joseph's	Victoria	260	25 pb.	30 pb.	27	30	10 C.D. +20 Tbc.	20 E.E.N.T. +6 urol.	3 g.	No	App.	January	July 1st	Yes	Straight

The following hospitals are "Recommended" and those who want details about them are requested to write to Dr. Agnew:

Homeopathic Hospital, Montreal; Montreal Children's Hospital, Montreal; Woman's General Hospital, Montreal; Christie Street Hospital, Toronto; St. Joseph's Hospital, Hamilton; St. Joseph's Hospital, Guelph; Westminster Hospital, London; St. Catharines General Hospital, St. Catharines; Grace Hospital, Windsor; St. Joseph's Hospital, Port Arthur; McKellar General Hospital, Fort William; Grace Hospital, Winnipeg; Moose Jaw General Hospital, Moose Jaw; Holy Cross Hospital, Calgary; Lamont Hospital, Lamont.

A. Forlong, as a memorial to his deceased wife, Grace Anne Forlong.

This new apparatus is the most modern and powerful x-ray equipment in Canada, producing a much more penetrating form of x-radiation than has hitherto been available for the treatment of cancerous growths in this country. The supervoltage therapy equipment is of the constant potential type with a nominal capacity of 400,000 volts at 5 milliamperes. Together with the other types of x-ray therapy equipment already in the hospital it is housed in the handsome new building specially constructed for the purpose.

Ample supplies of radium and radium emanation are available to the hospital from the Manitoba Cancer Relief and Research Institute, and the radiation from this new apparatus fills a gap midway between the gamma rays from radium and the x-rays generated by the older equipment at about 200,000 volts.

The generator is so designed that it is capable of producing 450,000 volts at 25 milliamperes in order that two or more tubes can be operated if desired. This increased capacity also can take care of any x-ray tube developments that may be available during the next ten years. The equipment consists essentially of the constant potential high tension generator system, the shockproof tube drum and control panel. The generator itself comprises two insulating transformers and the four self-contained 100,000 volt constant potential units together with the x-ray filament transformer, designed so that two additional units may be added later to increase the capacity to 600,000 volts.

The control board is designed so that the operator has complete control of every circuit in the apparatus. A two-way communication system between the operator and patient is a built-in feature. In addition to the necessary meters, a time clock records the total number of hours of x-ray tube life. A visual indicator is also provided showing exactly what filters are in use up to seven at one time, whether the lead shutter is open or closed, and whether the x-ray energy is on or off. This latter is necessary as the equipment is practically silent in operation. In addition, the control is provided with every necessary safety interlocking device that makes it impossible to operate the equipment unless the machine room door is closed, the rectifiers are operating correctly, the x-ray filament is energized, the oil pressure and temperature is correct, etc. A Yale type key switch is also incorporated, locking the whole system. The whole of the generator and control system was designed and manufactured in Canada by Ferranti Electric Limited at their Mount Dennis plant in Toronto.

Medical Societies

The Ontario Neuro-Psychiatric Association

The Fall meeting of the Ontario Neuro-Psychiatric Association for 1937 was held at the Ontario Hospital, on November 19, 1937. There was an attendance of 114.

The President, Dr. J. P. S. Cathcart, of Ottawa, presided. Dr. J. R. Howitt, Superintendent of the Ontario Hospital, Toronto, extended the welcome to the visiting association.

The President announced it was hoped that there would be one or two meetings of the Association in addition to the usual Spring and Fall meetings, and that these would be of a clinical nature, the junior physicians of the service being encouraged to contribute the programs.

The program for the afternoon session was as follows: "Rupture of the intervertebral disc", by Dr. William Baillie, of Toronto, discussed by Drs. W. S. Keith and W. C. Kruger; "Traumatic psychoses", by Dr. J. A. Cummins, of Ontario Hospital, Hamilton, discussed by Drs. W. W. Barraclough and E. A. Linell; "Review of recent and past literature on neuroses and psychoneuroses", by Dr. A. G. Morphy, of Lancaster, discussed by Dr. J. P. S. Cathcart.

The usual dinner followed the afternoon session. Dr. J. G. FitzGerald, Professor of Hygiene and Preventive Medicine, University of Toronto, was the guest speaker.

The following are the officers of the Ontario Neuro-Psychiatric Association: *Honorary President,* Hon. H. J. Kirby, K.C.; *President,* Dr. J. P. S. Cathcart; *Vice-president,* Dr. D. R. Fletcher; *Secretary,* Dr. A. McCausland.

Executive Committee.—Drs. B. T. McGhie, C. S. Tennant, G. H. Stevenson, S. G. Chalk, W. W. Barraclough, A. L. MacKinnon, J. S. Stewart.

Editorial Committee.—Drs. E. A. Clark, J. A. Hannah, C. B. Farrar, C. H. Pratt, C. A. Wicks.

A. MCCAUSLAND, *Secretary.*

The Regina General Hospital

At the pathological conference at the Regina General Hospital Dr. O. E. Rothwell gave a paper on sterilization. He stated that sterilization came under the criminal code of Canada and that any provincial laws on the matter were *ultra vires;* that in the case of Alberta if any patient who had been sterilized wished to take the matter to the courts no doubt he would find that the criminal code of Canada protected him and gave no protection to the doctor who performed the sterilization. Some years ago the Attorney-General's Department of Saskatchewan went into the matter. They cited many authorities to show that steriliza-

tion is a maim and that no doctor who performs this, even with the consent of the patient, has any protection from the courts but is liable under charge of criminal assault.

Dr. Paterson reviewed the salpingectomies done at the Regina General Hospital during the first six months of 1937. Four were classified as acute suppurative salpingitis, 12 chronic suppurative, 8 chronic non-suppurative, 1 tuberculous, 6 ectopic pregnancies, 5 chronic slight suppurative salpingitis which in his opinion did not require removal. Eight patients had normal tubes removed.

During the first six months of 1937 there were 172 dilatations and curettages done at the Regina General Hospital. Of these, 3 cases were adenocarcinoma; 3 were endometritis (unspecific, 2 cases, tuberculous, 1 case). There were 86 cases of endemetrial hyperplasia; of these 15 were marked, 64 were moderate, and 7 were slight. The moderate and slight cases were considered normal. There were two cases of membranous hyperplasia which had been operated on for dysmenorrhœa. There were two cases of decidual reaction; no chorionic villi were present. Ectopic pregnancy should be looked for in these cases. There were 55 cases of retained secundines.

LILLIAN A. CHASE

Post-Graduate Courses

International Medical Post-graduate Courses in Berlin

In spring of 1938 the following international medical post-graduate courses are prospected.

1. Constitutional pathology and clinical medicine. (From February 21st to 26th). Fee: 50,— RM.

2. Frequent mistakes in the diagnosis and treatment of internal diseases and their avoidance. (From February 28th to March 5th). Fee: 50,— RM.

3. Course on nourishment for healthy and sick. (From March 7th to 12th). Fee: 50,— RM.

4. Course on tuberculosis. (From March 14th to 19th). Fee: 50,— RM.

5. Course in diseases of the ear, nose and throat. (From February 28th to March 12th). Fee: 150,— and 100,— RM respectively.

6. Course for surgeons. (From April 25th to 30th). Fee: 70,— R.M.

7. Course for oculists in the University Eye Clinic. (From March 21st to 26th). Fee: 75,— RM.

8. Recent results in the field of the ray-therapy. (From May 2nd to 7th). Fee: 60,— RM.

9. Special courses in all branches of medicine, with practical work at the bedside and in the laboratory, to be held every month. For these courses participants are requested to communicate their wishes in order to obtain a complete program on their arrival.

Courses 1 to 8 will be held in German, and the special courses also in foreign languages.

For programs and further information apply to the Geschäftsstelle der Berliner Akademie für ärztliche Fortbildung, Berlin, NW 7, Robert-Koch-Platz 7 (Kaiserin Friedrich-Haus).

Topics of Current Interest

Etiology of Cancer of the Breast

The investigation of cancer by genetic methods has reached an interesting stage. The official publication of the International Union against Cancer[1] contains no less than three reviews on this subject, one by Prof. R. Korteweg of Amsterdam, one by Dr. L. Kreyberg of Oslo, and a third by Prof. Leo Loeb of St. Louis. A review on the same subject by Mr. A. P. Gorer appears elsewhere in this issue (of *The Lancet*). What has happened in this field of cancer research to stimulate all this activity? The study of cancer by the methods of genetics had disclosed the remarkable fact that by inbreeding it is possible to produce genetically pure strains of mice in which the mamma will exhibit the development of malignancy in either a uniformly high or a uniformly low percentage of female animals. Until recently this was advanced as an argument to prove that the etiology of cancer generally was essentially a problem of genetics and could be explained along mendelian lines. This view has never found acceptance by experimental pathologists. On general grounds they have been unable to look upon the highly complex group of biological phenomena, which for the sake of convenience are grouped together under the term "cancer," as if it was homologous to such comparatively simple biological phenomena as body size or coat-colour. Furthermore, in using a different tissue—the skin—as their test object, they found that although the skin of the mouse is very susceptible to the development of malignancy it does not show a high incidence of spontaneous skin tumours and that it was not possible by inbreeding to obtain a genetically pure strain of mice with a uniformly high incidence of spontaneous skin cancer. The study of carcinogenesis in the skin showed that the development of malignancy in that tissue depends on two main factors: the presence of

1. *Acta*, 1937, **2**: 136, 146, 148.

a carcinogenic substance applied from without and the factor of susceptibility of the skin to that substance. The further study of the development of mammary cancer in genetically pure strains has gradually led to the same conclusion. Thus W. S. Murray[2] found several years ago if the ovaries of mice of a pure strain with a high incidence of mammary cancer in the females were transplanted into the males of the same strain that mammary cancer could be made to develop in the males. A. Lacassagne[3] performed the crucial experiment of producing mammary cancer in the males of such a strain by the prolonged administration of the ovarian hormone—œstrone. He demonstrated, further, that œstrone will produce mammary cancer more readily in males belonging to a strain with a high incidence of mammary cancer in the females than in those belonging to strains with a low incidence, and that œstrone will fail to elicit mammary cancer in the males of a pure strain in which no spontaneous cancer of the mamma ever develops in the females. The conclusion that two factors —carcinogenic substance and susceptibility— are essential for the development of mammary cancer in pure strains was thus established as clearly as it had been for skin cancer in mixed strains. The apparent difference between the etiology of skin and mammary cancer finds an explanation in the fact that in mammary cancer both factors reside within the organism, while for the skin only the factor of susceptibility resides within the organism and the carcinogenic substance has an external origin. The result of inbreeding is to accentuate only the factor of susceptibility or insusceptibility as the case may be. As Mr. Gorer points out, an explanation along mendelian lines may be applicable to the inheritance of the factor of susceptibility but not to the more complex phenomenon — the incidence of cancer of the mamma. The term susceptibility to mammary cancer is a vague—a deliberately vague—term, and it is by no means established that the factor of susceptibility resides entirely within the cells of the mamma. Cramer and Horning[4] found that the adrenals of mice from a genetically pure strain with a high incidence of mammary cancer undergo spontaneously a specific process of degeneration preceding the appearance of cancer of the mamma, and that the same process of degeneration can be induced in mice of mixed strains, in which it does not appear spontaneously, by the prolonged administration of œstrone.

Another new problem is introduced by the remarkable observation of J. J. Bittner, referred to by Mr. Gorer, that the fostering of the newly born females from a high cancer strain by mice from a low cancer strain greatly reduces the incidence of mammary cancer. It must be realized that these animals belong to a strain which, according to genetic conceptions, is still genetically pure and ought to have a high incidence of mammary cancer. It follows that in genetically pure strains of mice "some influence," as Bittner calls it, is transmitted through the mother's milk, which is of prime importance in determining the incidence of breast cancer. Here again an explanation along genetic lines is not easy to imagine. What is the part played by this factor, transmitted by the mother's milk, in the etiology of breast cancer? Is it concerned with the susceptibility factor or with the carcinogenic factor? And what is the nature of this "influence?" Is it inanimate — a chemical substance, or animate—a virus? The ingenuity with which cancer research workers are unravelling these intricate conditions makes it likely that we shall not have to wait long for an answer to these exciting problems. They may have an important application in the prophylaxis of breast cancer in women. The evidence presented by Cramer[5] in a recent paper on the etiology of cancer of the mamma in the mouse and in man shows that in the human subject also the mamma is an organ for which the familial incidence of cancer is exceptionally high. — *The Lancet*, Leading Article, 1937, **2**: 455.

2. MURRAY, W. S.: *J. Cancer Research*, 1928, **12**: 18.
3. LACASSAGNE, A.: *C.R. Soc. Biol. Paris*, 1934, **115**: 937.
4. CRAMER, W. AND HORNING, E. S.: *J. Path. & Bacteriol.*, 1937, **44**: 633.
5. CRAMER, W.: *Am. J. Cancer*, 1937, **30**: 318.

Abstracts from Current Literature

Medicine

The Central Nervous System and Sugar Metabolism. Vonderahe, A. R., *Arch. Int. Med.*, 1937, **60**: 694.

In view of the lack of correlation in many cases between the clinical picture and the lesions found in the pancreas in diabetic patients the author seeks an explanation in the pituitary or hypothalamine tissues. Tumours or injuries in this neighbourhood very frequently carry an associated glycosuria. The exact location of the lesion did not appear to be important in the cases quoted, so long as the tissues were sufficiently deranged by pressure, hæmorrhage or other injury. Again, evidence contributed by many investigators pointed to the hypothalamus as the location of the "centre" most vitally concerned. Five cases are quoted, one of subarachnoid hæmorrhage, two of gross hæmorrhages in

the midbrain pressing on the hypothalamus, one of cyst in the same region, and one of multiple capillary hæmorrhages in the hypothalamus. The author quotes a report on changes in the hypothalami of 15 diabetics and 5 other cases with differing diseases which shows a constant loss of cells in the nucleus paraventriculosus (and some retrograde changes in the other cells) in the diabetics, a lesion not found in the other cases. Also, the substantia grisea of the 3rd ventricle and the nucleus tuberalis lateralis showed degenerative changes in the cases that had shown psychotic states in life.

The author develops a theory that since the nucleus paraventricularis has a fibrous connection with the nucleus supraopticus, which is connected to the posterior lobe, and since the pituitary sends secretion into the hypothalamus which can effect hypothalamine nuclei, with these and other possible connections, the vagus and its control over the islands of Langerhans can be brought into action, making the nucleus paraventricularis a central stimulator of the production of insulin. Possibly the presence of sugar in the blood also stimulates this nucleus, as CO_2, the respiratory centre. Apparently persistent hyperglycæmia leads to exhaustion of this centre. It is suggested that the pituitary inhibits the action of the nucleus paraventricularis so that an increase in pituitary secretion would reduce the production of insulin and vice versa. These effects would be more lasting than those of the sympathetic system as occurring in states of anger and rage which are transitory.

P. M. MACDONNELL

The Supplementary Feeding of School Children. Wood, E. C. and Simpson, T. W., *Med. Press & Circular,* 1937, **195**: 370.

Additional nourishment for school children has been receiving widespread attention of recent years. It has been very difficult to assess the value of this, since the diet is generally provided by parents with one eye, if not both, on the purse. However, statistical studies have shown that on the whole children are benefited by supplementary diet, but emphasis is laid on the need for balanced and readily assimilable food, rather than vitamin concentrates.

The present study covers a group of 72 boys and 72 girls between the ages of 8 and 11 years. For one year they were given daily equal calorific quantities of either milk, cod liver oil and malt, or virol, while a control group received no special treatment. The growth rate of the control group was subnormal. Those receiving the supplements showed significant improvement in weight, virol being the superior. There is special need for supplementary food in the summer term, especially in boys. Milk was no particular benefit at this season. Malt and cod liver oil benefited the females only. Virol benefited both sexes and gave a growth rate double that of the controls. It is concluded that a supplementary diet should contain as many of the essential food elements as possible, without excessive protein, and should be neither bulky nor unpalatable.

H. MACDERMOT

Surgery

Enterectomy in the Surgical Treatment of Hepatic Cirrhosis or Portal Obstruction with Ascites. Fuller, M. K., Cook, D. D. MacK., Walter, O. M. and Zbitnoff, N., *Surg., Gyn. & Obst.,* 1937, **65**: 331.

The authors contend there are four reasons why this operative measure should be considered of value. The first is a mechanical one, and consists of obliteration of part of the portal venous bed. The second is a physicochemical hypothesis of increased osmotic pressure in the remaining small bowel, thus slowing the rate of absorption with a consequent higher osmotic portal venous pressure. The portal venous blood must contain more metabolic waste products because of the slowed rate of flow so that removal of a percentage of these must lessen the permeability of the liver cells and increase the chances of regeneration of liver tissue. Finally, assuming that ascitic fluid is transuded through the visceral peritoneum, therefore, by increasing the ratio of parietal peritoneum more absorption will take place.

In the one case cited they removed 6 feet 8 inches of the small bowel, beginning 12 inches distal to the duodenaljejunal junction, with lateral anastomosis. Prior to operation the patient had spent 2½ years in his wheelchair. He was allowed up 10 days after operation; the tappings were continued for six months, with markedly delayed filling of the peritoneal cavity. It is now three years since the operation and the patient has been able to be around in his business clothes most of this time. His diet has been foods of his own taste.

FRANK DORRANCE

Pyogenic Osteomyelitis of the Pelvis. Kulowski, J., *Arch. Surg.,* 1937, **35**: 571.

This is a relatively common devastating disease. In a series of 1,496 cases of pyogenic osteomyelitis there were 90, or 6 per cent, in which the focus of infection was in the pelvis. Pelvic osteomyelitis is primarily a disease of the growing period. About 60 per cent of Kulowski's patients were in the second decade. Antecedent trauma occurred in 35 cases. Pelvic osteomyelitis may be classified as a direct or a hæmatogenous infection. The former follows gunshot wounds, operations and compound fractures and is due to extension from a neighbouring suppurative process and infected decubiti. Seventy-four per cent of the cases were of the hæmatogenous form. Staphylococci were recovered in the great majority of instances.

The most striking feature of pelvic osteomyelitis is the relatively "dry" bony reaction as a subacute or chronic fibrous type of osteomyelitis. Extensive suppuration of the soft tissue is characteristic and was observed in 83 per cent of the series, and determined the course of the disease. Purulent collections tended to gravitate and accumulate in the anatomically related fascial spaces of the thighs, the lower part of the back, and the gluteal regions. Infected compound fractures of the pelvic bones are especially interesting because of the relationship of the bladder and the posterior portion of the urethra. The disease becomes chronic in practically all survivors. In differentiating this lesion, interest centres about the hip joint but also involves a discussion of a wide variety of other intra-pelvic lesions, such as inflammation of the lower part of the abdomen and pelvis, spondylitis of the lumbar and lower part of the dorsal region, sub-gluteal bursitis, malignant disease, tuberculosis and isolated abscess of the iliopsoas muscle. Roentgenographic examination is essential. Treatment resolves itself into the primary and secondary control of the disease. The former involves the initial systemic infection and the determination of the local suppurative process. Secondary control of the disease is based on anticipation of pathological extension, sequestrum, secondary infection, persistant sinus and exacerbations and, above all, on locomotor disturbances. G. E. LEARMONTH

Obstetrics and Gynæcology

Methods and Results of Treatment in Carcinoma of the Cervix at the Memorial Hospital. Healy, W. P. and Frazell, E. L., *Am. J. Obst. & Gyn.*, 1937, **34**: 593.

Five hundred and fifty-one cases of histologically proved primary carcinoma of the cervix treated at the Memorial Hospital, New York, during the years 1928 to 1931 inclusive were used as a basis for this statistical study. Analysis shows that the salvage, as measured by the five-year survival rate, is improving but is still far from satisfactory. Further improvement of these results is dependent upon earlier diagnosis. Seventy per cent of the patients seen in this series were either advanced or hopelessly ill on admission. Because of the long silent period of growth many cases will not be diagnosed until late unless more frequent pelvic examinations are made.

The dose of effective radiation delivered to points 3 cm. or more lateral to the cervical canal is inadequate to control the disease in 70 per cent of the cases. Changes in technique are directed toward increasing the dose to the parametria without destruction of normal structures. The prognosis is influenced by the clinical stage of the disease, the age of the patient and the dosage given. The importance of preliminary roentgen radiation is stressed. Important complications are noted. ROSS MITCHELL

Carcinoma of the Cervix During Pregnancy. Danforth, W. C., *Am. J. Obst. & Gyn.*, 1937, **34**: 365.

The frequency of carcinoma of the cervix in pregnancy is about 0.03 per cent. Abortions are frequent and placenta prævia more common than in normal pregnancy. Labour may be gravely dangerous. Carcinoma is very rarely transmitted to the fetus. Unless pregnancy terminates prematurely carcinoma of the cervix seems to develop as well as in the non-pregnant.

The results of treatment are far better during the first six months. Irradiation, both by radium and deep x-ray, is the most effective treatment. This should be done at once unless the pregnancy is so far advanced that it is desired to allow the child to attain viability. If full radiotherapy is used the pregnancy is better terminated because of the risk of serious developmental harm to the infant. A moderate radium dosage may be used to check the growth of the tumour in order that the child may attain viability with less likelihood of harm.

Labour may be permitted to begin spontaneously if the cervix has a sufficient uninvaded area to permit dilatation enough for the passage of the child. Incision or dilatation of the carcinomatous cervix is gravely dangerous. If labour is not possible, Cæsarean section should be done as an elective measure. This should be followed by a Ries-Wertheim radical hysterectomy or subtotal hysterectomy with irradiation of the carcinomatous stump. The latter is favoured. ROSS MITCHELL

Ophthalmology

New Experimental Researches in Trachoma. Cuénod and Nataf, R., *Ann. d'Ocul.*, 1937, **174**: 433.

The authors introduce the subject with a review of the work which they, associated with Charles Nicolle, have been carrying on. It is over thirty years since one of them with Nicolle began the experimental study of trachoma and arrived at certain conclusions which have been confirmed by recent pathological examinations. In 1909 and 1911 these authors, continuing their researches, reported upon a series of experiments done on the chimpanzee and man and demonstrated that the chimpanzee offers a perfect receptivity and that in him the lesions are of the same type and run the same course as in man. The beginning of trachoma is accompanied neither by inflammatory phenomena nor hypersecretion. The best method to bring on infection in the monkey is by means of scarifica-

tion, as without doubt trachoma may begin in man following the most superficial abrasion of the conjunctiva. Finally, trachoma in the chimpanzee is inoculable during a long period of its course; it is contagious in man under the same conditions and not only at the beginning of the disease, as we had up to then believed.

In reporting this new work the authors definitely demonstrated the insidious character of the onset of trachoma and the lengthy period that it was contagious. To crown these experiments Nicolle and Cuénod demonstrated in 1912 that the agent of trachoma was a filterable virus. They then describe in detail their experimental work in their study of the virus, also the details of the study of the trachomatous tissue and scrapings from the follicles of trachoma in which they found what they call "plastilles" (drops of plasma), and which they believe are analogous to the inclusions found in the epithelial cells by Prowazek and Halberstaedter. At different times they have inoculated lice, guarding against any outside contamination with trachoma virus, and the result was always a veritable swarm of rickettsia elements in the intestines, while the control lice remained normal. On the other hand, in many cases of infantile folliculosis or non-trachomatous conjunctivitis the inoculation of lice with conjunctival discharge was always negative. From their inoculation experiments with monkeys they believe that the trachoma virus might very well be classed in the rickettsia family, which may be more or less transmitted by agents of this family; and, secondly, if lice are not the only transmitters of trachoma they may constitute more or less of a reservoir for the trachomatous virus. The article is very extensive and should be read in the original, as it is too long for a complete abstract. S. HANFORD MCKEE

Urology

Hormone Excretion in Cases of Prostatic Hypertrophy. Rusch, H. P. and Kundert, P. R., *J. Urol.*, 1937, **38**: 316.

The theory that the etiology of some types of prostatic hypertrophy may be a disturbance of the sex hormones has attracted the interest of numerous workers during the past few years. The fact that the anatomical and physiological integrity of the prostate in animals depends upon gonadal stimulation has been proved. Castration of such animals leads to atrophy of the gland, while the male sex hormone administered to a castrated animal maintains the prostate in a normal condition. Furthermore, the female sex hormone, œstrin, when administered to male laboratory animals, produces a condition of the prostate analogous to prostatic hypertrophy in man. This latter condition can be prevented if the male hormone is administered in conjunction with it.

Because of the large number of confusing reports on the quantitative measurements of hormonal substances in the urine the authors made determinations of both the androgenic and the œstrogenic hormones in the same specimen of urine. They conclude that in men suffering from prostatic hypertrophy there is relatively no change in the œstrogenic hormone, but that there is a definite decrease in the androgenic hormone in the urine. These findings tend to substantiate the theory that some cases of prostatic hypertrophy may be the result of a disturbed balance of the sex hormone.

J. V. BERRY

Primary Carcinoma of the Male Urethra. Harbach, F. O., *J. Urol.*, 1937, **38**: 311.

Carcinoma of the urethra is rare. The literature is unanimous in this opinion, as it is also unanimous that this rare neoplasm is of a low degree of malignancy, is slow to metastasize, and is, due to its location, particularly suitable for resection. It is a disease of middle age, though Paton reports a case in a youth aged 18, and Kroiss reports a case in a man aged 91. The symptoms are those of lower tract involvement. The author believes every case of urethral fistula and stricture should be regarded as a potential case of urethral carcinoma. Kretchmer classifies the manifestations into four stages: (1) urethral stricture; (2) tumour formation; (3) infection, and it is here the diagnosis of periurethral abscess is made; and (4) the presence of a fistula or fistulæ. Hæmaturia in every case was one of the earliest signs.

The treatment of choice is radical operation, with block dissection of the inguinal nodes. In the very early cases radium may be used. The prognosis is poor, due to late diagnosis of the condition. A case is cited. J. V. BERRY

Neurology and Psychiatry

Loneliness and the Paranoid Syndrome. Parfitt, D. N., *J. Neurol. & Psychopathol.*, 1937, **17**: 68.

In a pleasingly clear fashion the author points out the possible causal influence of loneliness in the appallingly numerous group of paranoids seen, particularly in women of the late middle-aged and pre-senile age groups. Cases are cited showing the frequency amongst widows and spinsters left alone, feeling their loneliness acutely, yet too proud and stubborn to endeavour to alter the situation. Delusions and ideas of reference are common, generally sexual in colouring, and presumably serving the double purpose of projection of blame and the gaining of attention.

Cardiovascular degeneration, high blood pressure, senile and menopausal changes serve to enrich, but not to create, the soil for the growth of this persecutory complex. It is not

suggested that loneliness is essential for the development of such paranoid pictures, but the author merely wishes to emphasize the importance of this factor, because in the early stages a good response to tactful overtures of friendship may be obtained, and constitutes the chief hope of averting severe breaks and certification.

G. PATERSON-SMYTH

Extramedullary Tumours of the Upper Cervical Portion of the Spinal Cord. Saltz, S. E. and Jervis, G. A., *Bull. Neurol. Inst. of N.Y.*, 1937, **6**: 274.

The diagnosis of extramedullary tumours of the upper cervical cord is not readily made in the early stages. It is not unusual to find the clinical picture of amyotrophic lateral sclerosis, similar to that of a spinal cord neoplasm in this region. Occasionally the clinical picture of dorso-lateral sclerosis is merely a prelude to the fully developed syndrome of cervical cord neoplasm. At times cerebellar signs occur with pyramidal involvement in these high cord tumours and may dominate the clinical picture, making it difficult to differentiate from multiple sclerosis. Involvement of the lower cranial nerves provides evidence of intracranial extension, and, taken in conjunction with the spinal cord signs, suggests an extramedullary lesion. Tenderness of the cervical vertebræ is of frequent occurrence. Manometric pressure determinations generally show considerable variation as to the presence or absence of block, probably due to the origin and growth of the neoplasm within the widest portion of the vertebral canal. Tumours which are situated ventrally display minimal sensory disturbances without a true sensory level. Regional localization is frequently made on the basis of the distribution of muscular atrophy. In 2 of the 5 cases reported by the authors the tumour was situated within the spinal cord exclusively; in the other 3 it originated in or extended into the posterior cranial fossa.

FRANK TURNBULL

Dermatology

Skin Eruptions in Patients Receiving Sulfanilamide. Manville, J. G. and Archinard, J. J., *J. Am. M. Ass.*, 1937, **109**: 1008.

Eruption During Administration of Sulfanilamide. Goodman, M. H. and Levy, C. S., *J. Am. M. Ass.*, 1937, **109**: 1009.

Dermatitis from Sulfanilamide. Frank, L. J., *J. Am. M. Ass.*, 1937, **109**: 1011.

Purpuric and Scarlatiniform Eruption Following Sulfanilamide. Schouberg, J. L., *J. Am. M. Ass.*, 1937, **109**: 1035.

Sulfanilamide: A Photosensitizing Agent of the Skin. Newman, B. C. and Sharlit, H., *J. Am. M. Ass.*, 1937, **109**: 1037.

Hypersensitivity to Sulfanilamide. Salvin, M., *J. Am. M. Ass.*, 1937, **109**: 1038.

Skin eruptions following the use of sulfanilamide are being reported with increasing frequency as the use of this drug is becoming more widespread. The six articles referred to above sum up the general character of the eruption and its etiological features. As in the case of many other drugs producing dermatitis medicamentosa, there is a characteristic eruption most commonly observed but a number of variations and even completely atypical reactions also occur. What proportion of the skin-eruption is attributable to toxicity of the drug and what to idiosyncrasy is undetermined. There appears to be evidence that reactions bear some relation to the concentration of the drug in the blood. Due to well known hæmolytic properties of the benzene ring it has been anticipated that hæmolytic anæmia would be observed. This occurred, and some relationship would appear to exist between this and the appearance of the rash, as in the case of the barbituric-acid derivatives. It has been observed that in most of the cases where the rash has been reported a high blood level of the drug has been aimed at. That the drug has vasculo-toxic properties seems evident from the occurrence of purpuric characters in the eruption in some cases. It has also been suggested that the eruption is of an allergic nature. Certainly a very small dose is sufficient to produce an eruption in some cases. One observer described an intense urticarial reaction accompanied by sneezing and lachrymation.

A striking feature, emphasized by two of the reporters, was the part played by exposure to sunlight. In ambulatory cases of gonococcal or streptococcal infection the eruption occurred only after recorded exposure to sunlight. From other reports it is apparent that the parts most likely to be exposed to sunlight—head and neck, extensor surfaces of arms and dorsum of hands —are most frequently affected. There appears to be a very good basis therefore for the recommendation of Newman and Sharlit that physicians should warn their patients receiving sulfanilamide to avoid exposure to direct sunlight.

The eruption is morbilliform or scarlatiniform, at times vesicular or purpuric, and on occasion has been accompanied by a febrile reaction. Desquamation usually follows. The resemblance to the reactions produced by phenobarbitol and its near relations is noteworthy.

D. E. H. CLEVELAND

Therapeutics

The Effect of Amniotin and Antuitrin-S in Diabetes Insipidus. Blotner, H., *New Eng. J. Med.*, 1937, **217**: 592.

Experimental evidence has appeared suggesting that the administration of œstrogenic sub-

stance may suppress the diabetogenic and sex principles of the anterior lobe of the pituitary gland. The polyuric effect of certain extracts of the anterior lobe of the pituitary has been reported. It is believed that this lobe secretes a diuretic substance. Can this diuretic principle be suppressed in a similar manner? There have appeared clinical investigations to substantiate this idea.

This paper reports observations on 7 patients with diabetes insipidus following the injection of large doses of amniotin and of antuitrin-S. Daily fluid intake and output was observed before and after the administration of amniotin and antuitrin-S. In five cases 20,000 units of amniotin were injected daily for ten consecutive days. In 4 cases 1 c.c. of antuitrin-S was administered subcutaneously daily, or every other day, for two months. The persons studied were 3 men, 1 boy and 3 women who had had diabetes insipidus of idiopathic origin for a number of years. They were all relieved of the polyuria with the intramuscular or intranasal administration of pituitrin. They represented a variety of types—two essentially normal young men, two males with marked sexual underdevelopment, a young woman before the menopause, a woman beyond the menopause, and an obese woman after menopause without thyroid gland. The administration of amniotin or of antuitrin-S did not cause any decrease in the daily fluid intake and output of these patients.

LILLIAN A. CHASE

Prontosil and Similar Compounds in the Treatment of Puerperal Hæmolytic Streptococcus Infections. Gibberd, G. F., *Brit. M. J.*, 1937, **2**: 695.

The new aniline derivatives have been employed at Queen Charlotte's Hospital since 1936; in the doses in which they have been given their use appears to be free from serious danger and has been followed by a very great reduction in the mortality rate for hæmolytic streptococcal infections. Analysis of the causes of this improvement in mortality rate shows that it is associated mainly with a decrease in the widespread invasion of tissues by the hæmolytic streptococcus rather than with a greater tendency to resolution of the disease once widespread invasion of tissues has occurred. This feature makes it necessary to consider whether the improvement since January, 1936, is due to the efficacy of the treatment or whether it is due to a change in the virulence of the prevalent organism. It is possible that both factors may be concerned. In non-fatal cases in which tissues beyond the limits of the birth canal have been invaded by the hæmolytic streptococcus there is some clinical evidence that the new drugs do actually hasten the resolution of the inflammatory process, and this is a good reason for believing that the treatment, rather than a change in the virulence of the organism, is responsible for the improvement in this direction.

While one is unwilling to guess how far the new drugs have been responsible for the undoubted improvement which has followed their clinical use, there is every reason to continue to employ them until their value or otherwise is firmly established.

ROSS MITCHELL

Hæmorrhage into the Pleural Cavity. Head, J. R., *Surg., Gyn. & Obst.*, 1937, **65**: 485.

Hæmothorax is as old a surgical problem as warfare between human beings. Hippocrates believed that blood in the pleural cavity always became infected. Guy de Chauliac, Ambrose Paré, Laennec and Trousseau always closed the wound and allowed their further treatment to be guided by clinical progress. In the Great War early pneumothorax was induced by some Italian surgeons; more recently ligation of the anterior and posterior intercostal vessels, with suture of the lung-wound edges to the chest-wall has been practised. The author believes a closed acute hæmopneumothorax or hæmothorax controls hæmorrhage; he advises "watchful waiting" for the two indications, relief of rising intrapleural pressure or falling blood pressure.

The progressive decrease in blood pressure is aggravated by the decreased vital capacity, the increased resistance to intrapulmonary circulation and the pressure upon the heart and great veins. In dangerously increased intrapleural pressure the severe dyspnœa with the characteristic exaggerated Traube-Hering waves calls for aspiration of blood or (and) air. Blood in the pleural cavity does not clot; in the first few hours it may safely be reinjected. In general, a systolic blood pressure below 80 is an indication for transfusion. Forty-eight hours after stabilization of the blood pressure and respiration takes place replacement of blood by air should be carried out with maintenance of pneumothorax for 2 weeks to allow the lung to heal. Calcification of pleura and infection are rare. The author much prefers the closed method of treatment.

FRANK DORRANCE

Pathology and Experimental Medicine

The Precancerous Cervix. Strachan, G. I., *J. Obst. & Gyn. Brit. Empire*, 1937, **44**: 625.

The author clearly defines the precancerous cervix, and states the predisposing factors and microscopic cell change leading up to true can-

cerous changes in the cervix. The investigation is based on 700 cervices removed for inflammation during the past ten years. A precancerous cervix is one-half way toward malignancy and is certain to proceed along this line unless checked. It is not definitely known whether a biological process affects one cell first and spreads from here to involve other cells, or whether a group of cells is primarily affected as a focus. Erosions, cervicitis, and ectropion predispose to abnormal proliferation in cervical epithelium; also leukoplakia of the cervix has the same relation to cancer here as it has in the vulva, skin, tongue, etc. The loss of elastic tissue below the basal-cell layer of squamous epithelium, spoken of as the de-elasticized and de-collagenized layer, with appearance of lymphocytic infiltration, allows downgrowths of epithelium. When these downgrowths become sharp-pointed they are more penetrative. In non-malignant squamous epithelium the cell cytoplasm is evenly stained, but in precancerous conditions the cytoplasm stains unevenly. Hyperchromatic particles are often seen in these areas, and if oil-immersion magnification is used mitotic figures are clearly shown. The larger size of the nucleus is also of importance. In the cervical canal the main precancerous change noticed was that the glands lose their racemose appearance and revert to simple tubular type. This change represents a metaplasia of the gland as a whole and not, necessarily, of the epithelium lining it.

P. J. KEARNS

Hygiene and Public Health

Girth and Death. *Statistical Bulletin*, Metropolitan Life Insurance Company, 1937, **18**: 2.

"The longer the belt line, the shorter the life line." This observation is one of the most fundamental contributions of life insurance statistics to public health. The most recent insurance statistics show that men 35 per cent or more above the average weight have a mortality over one and a half times that of average-weight men; this despite the fact the overweight men are subjected to a more rigid examination than others before acceptance for life insurance. In the ages under 30 slight overweight is associated with favourable mortality, but over 30 overweight appears increasingly as an unfavourable condition. Most of the chronic diseases of maturity appear to bear more heavily on the overweights, particularly the cardio-renal group and diabetics. Even fatal accidents are more common among overweights.

It is evident that great gains in individual and community health are to be achieved by reducing the incidence of overweight. But in working towards this goal great care must be taken not to make the cure worse than the disease. There is some evidence that unsupervised attempts to reduce weight sometimes end in disaster. For this reason it is advisable that a reducing regimen should be under the control of a physician. This is particularly true in the case of young women. Unless overweight is excessive in this group there are no indications for reducing weight.

FRANK G. PEDLEY

Supply and Demand in the Professions in Canada. Dominion Bureau of Statistics, Ottawa, 1937.

The 1931 census gives some interesting figures regarding the number of physicians in relation to the population of the provinces and municipalities in which they live. The impression that there has been a relative increase in the number of physicians is not borne out by the following figures:—

	Population per doctor			*Population per doctor, 1931*	
	1931	1921	1911	*In cities of 3,000 or over*	*In other areas*
Canada	1,034	1,008	969	644	1,350
Prince Edward Island	1,397	1,303	1,302		
Nova Scotia ...	1,152	1,146	1,207	511	1,379
New Brunswick.	1,519	1,447	1,252	779	1,734
Quebec	1,046	1,065	1,002	704	1,375
Ontario	872	848	826	611	1,096
Manitoba	1,051	1,095	1,052	570	1,707
Saskatchewan ..	1,578	1,446	1,299	674	1,720
Alberta	1,255	1,074	1,015	610	1,800
British Columbia	954	861	943	695	1,289

	Population per doctor
Canada, 1931	1,034
United States, 1930	798
England and Wales, 1931	1,363
Australia, 1921	1,373
France, 1931	1,555

FRANK G. PEDLEY

HYPOGLYCÆMIC TREATMENT OF SCHIZOPHRENIA.—In a preliminary report of their experiences with the hypoglycæmic treatment of the schizophrenic reactions, C. A. Rymer, J. D. Benjamin and F. G. Ebaugh discuss the methods of study employed as well as the actual results obtained in their series of 7 completed cases. They feel that the results to date (excellent results were obtained in 5 of their 7 patients) are highly encouraging, although a long period of time will be necessary before a definite opinion can be given. Apart from its therapeutic value, the method offers an unusual opportunity for clinical and laboratory research. The most promising approach at the present time appears to them to lie in the qualitative study of remissions; not only whether the insulin treatment increases the number of remissions but also whether these are in any way better than or different from spontaneous remissions.—*J. Am. M. Ass.*, 1937, **109**: 1249.

Obituaries

Dr. Matthew Robert Blake, member of parliament for North Winnipeg, 1917 to 1921, and honorary Lieut.-Colonel of the Winnipeg Light Infantry, died in St. Boniface Hospital on November 21, 1937. Dr. Blake was born in Belfast, Huron Co., Ont., in 1876 of English-Irish parents. On his father's side he traced his ancestry back to Admiral Blake who served England so well in Cromwell's time. He graduated from Trinity Medical College, Toronto, and did post-graduate work in London and Dublin. Coming to Winnipeg thirty-five years ago Dr. Blake built up a large practice. In 1912 he assisted in raising the Winnipeg Light Infantry, and was Medical Officer of the regiment from that time till 1932, when he retired and received the long service medal.

He is survived by one son, Dr. Daniel Blake, now doing post-graduate work in London, and a daughter at home. He was buried with full military honours on November 23rd from St. Giles United Church to Elmwood cemetery.

Dr. Wendell Warden Carrothers, of Galt, Ont., died suddenly on November 27, 1937. He was born in 1892 and a graduate of the University of Western Ontario (1920).

Dr. Henry Hicks Coleman died at his home in Moncton on November 22, 1937, aged eighty-four years. He had been ill for about two years. Dr. Coleman had practised in Moncton for forty-three years. He was born in Sackville, N.B., on March 2, 1853. He was educated at Harkin's Academy at Newcastle, and graduated from the University of New York in medicine in 1877. Dr. Coleman was medical director of the port of Moncton and Physician-in-Charge of medicine for the Indian population in his county. He had always been a staunch supporter of the Moncton City Hospital, where for many years he served as anæsthetist.

Dr. William Caldwell Crockett, senior physician in the city of Fredericton, died on November 15, 1937, at his home in that city. He was seventy-seven years of age, having been born at Campbellton on July 25, 1860, the son of the late Dr. William Crockett. Dr. Crockett was educated at Chatham and later at the Fredericton Collegiate School. He obtained a B.A. degree at the University of New Brunswick in 1882 and his M.A. in 1884. He graduated M.D., C.M., from McGill University in 1886 and was valedictorian in his class. In the same year he received the diploma of L.R.C.P.(Lond.). He had been mayor of the city of Fredericton and a member of the legislature of New Brunswick. He had also been Chairman of the Board of Health for Fredericton and had served in many other civic and social capacities. He is survived by his widow, two daughters, and four brothers.

Dr. Hertel Lefebvre de Bellefeuille, of Montreal, member of the St. Jean de Dieu Hospital staff, died in his thirtieth year at the Ste. Justine Hospital on November 8, 1937.

Born in Montreal in 1908, he was the son of Dr. Gaston de Bellefeuille and Cecile Dalbec. After his studies at Ste. Marie College, he completed his medical course at the University of Montreal (1935) and spent two years in Europe on post-graduate work.

Dr. Louis Joseph Desy, of Montreal, died in Paris on December 7, 1937. He had retired from practice about ten years ago after being a general practitioner in Montreal for thirty years. He was born near Berthierville, Que., took his classical course at L'Assomption College, and graduated in medicine from the old Laval University Medical School, Montreal (1889).

Dr. Hugh Alexander Elliot, for the past ten years Medical Officer of Health for Leaside, and a Coroner for Toronto since 1934, died on November 16, 1937, aged forty-five. He was the son of Mrs. Elliot and the late Rev. J. J. Elliot, and was born in Hillsburg. He graduated from the University of Toronto in 1916. He served with the Canadian Army Medical Corps in the Great War.

Dr. James Switzer Freeborn, of Magnetawan, Ont., died on November 8, 1937. He was born in 1858 the son of the late Andrew and Emily Freeborn, of Invermay, Ont., and was a graduate of Toronto School of Medicine (1885). He served during the Riel Rebellion as an army surgeon. After post-graduate work in England he took up practice in Markdale and for forty years had practised in Magnetawan.

Dr. Jerome F. Honsberger, of Kitchener, Ont., died on November 9, 1937, in his seventy-ninth year. He was a graduate of the Medical Faculty of Trinity University (1886), L.R.C.P.(Lond.) (1886).

Dr. William James Kennedy, of Musquodoboit Harbour, N.S., died on November 9, 1937. Dr. Kennedy was the son of the late Rev. John and Mary Kennedy, of London, Ont. He was born in 1873 and graduated in medicine from Western University, London, Ont., in 1897.

First taking up practice at Casselman, Ont., he remained there for about a year, coming to Nova Scotia 38 years ago on hearing of a vacancy at Musquodoboit Harbour. Here he remained ever since, to become the hard working country doctor and family physician, excepting for a short time which he spent in post-graduate work in London, England.

Dr. Richard Mason Lipsey, of Toronto, died on November 25, 1937, at Toronto General Hospital after a brief illness. He practised medicine in St. Thomas for 40 years, being a native of that city, where he was born in 1864. He taught school there, and was a graduate of the University of Toronto in 1894.

In electro-therapy and x-ray work, Dr. Lipsey was one of Canada's pioneers, being one of the first physicians to own and operate an x-ray machine in this country.

Dr. Donald McKenty, of Winnipeg, died from coronary occlusion on December 3rd at his home. He was born on Amherst Island, Lake Ontario, in 1870 and came to Winnipeg in 1887 to visit his uncle who, at that time, was owner of the Manor Hotel. On his uncle's death he entered the Manitoba Medical College and graduated at the age of 46. He practised in Winnipeg until the time of his death. He is survived by his widow, three sons and two daughters. Two of his sons, Jack and Vincent, are practising medicine in Winnipeg.

Dr. Moses Louis Ship, of Montreal, died on November 3, 1937, after a lengthy illness. He was fifty-nine years of age.

Dr. Ship was born in New York but came to live in Montreal at an early age. He studied at Montreal High School and McGill University, graduating in medicine from the latter in 1902. He then took a post-graduate course in England and on the Continent, where he specialized in children's diseases and internal medicine.

Upon his return to Canada, Dr. Ship established the first milk station in Montreal and for years assisted actively in the work of the Montreal Foundling Hospital. He was the founder of the Herzl Dispensary and Hospital in Montreal and it was largely due to his efforts that the Montreal Jewish Hospital was established.

Dr. John Stenhouse, of Toronto, died on November 25, 1937. He was M.A. and B.Sc. of Edinburgh and M.B. Toronto (1894).

Dr. Charles James Wagner, of Toronto, died on November 16, 1937, of cardiorenal disease at the age of sixty-two. He had practised in Toronto for 36 years.

Dr. Wagner was born in 1875 and graduated from the University of Toronto in 1899, and spent a year abroad, studying principally in Strasbourg. On his return he began practice with his father, the late Dr. W. J. Wagner, and was appointed Demonstrator in the Department of Pathology of Toronto University. He served in this capacity until 1910. In the session of 1907-08 he was Demonstrator in Applied Physiology, and in the same session joined the clinical staff of medicine. In this department he taught until 1919 devoting himself to a busy general practice until a few weeks before his death.

Dr. Wagner was fortunate in his choice of an avocation. He was a violinist of real ability and his talent made him a valued member of the Arts and Letters Club. His wide knowledge of chamber music and his technical skill gave him a place in the inner circle of amateur musicians and he had friendships with many of the great professionals. He was an enthusiastic fisherman and his last triumph was the landing of a four foot maskinonge, taken with a casting line six weeks before his death.

Dr. Wagner was married in 1901 and enjoyed a singularly happy home life. He is survived by his wife and three married daughters. He was a charter Fellow of the Toronto Academy of Medicine, and held in respect and affection by a large circle of his fellow practitioners and colleagues in the university.

M. H. V. CAMERON

News Items

Alberta

At the close of nominations for representatives for the two-year term on the council of the College of Physicians and Surgeons of Alberta, it was found that there was only one nominee in each district; therefore the following were elected by acclamation. Drs. W. G. Anderson, Wardlow, District No. 1; R. Parsons, Red Deer, District No. 3; A. E. Archer, Lamont, District No. 5; W. A. Wilson, Edmonton, District No. 7.

The special committee appointed to prepare the submission of the medical profession to the Royal Commission met in Calgary, December 4th, 1937, and practically completed its work. While a copy of the proposed submission is not available, it is understood that the Commission's attention is being called to the ever increasing tendency to demand larger and more varied services by the public at the cost to the people as a whole, and that provincial revenues are insufficient to meet the need; consequently a responsibility seems to be placed on the National Government with its unlimited taxing power to take some action. Burdens have been placed on the provinces by the immigration of unfit people of other lands, therefore it is contended that the authority responsible for this immigration must be under an obligation to care for those who are unable to care for themselves. The records of the mental and tuberculosis hospitals indicate that the provinces are under a heavy burden, which should be lifted.

A meeting of members of the profession interested in the question of an organization to control cancer met in Calgary recently, and went on record as giving hearty cooperation with the Dominion Government. Steps are to be taken immediately to organize the whole province, when it is hoped, that active local committees will be set up in the various centres, such committees being composed of laymen as well as physicians, and being representative not only of individuals, but of service clubs, churches, and all organizations with humanitarian motives. It is hoped that, while not frightening the people, the province may become cancer-conscious, thus being willing to seek and follow authoritative advice in the matter of early diagnosis and treatment of one of man's greatest enemies.

A plan is on foot to have the family physician assist the Department of Health in locating cases of active tuberculosis which are untreated at the present time, and endeavour to get the patients to submit to recognized treatment, thus reducing the loss of life from a curable ailment. Since under the recent legislation the province assumes all cost of hospitalization, it is felt that better cooperation should be possible.

In two by-elections in Alberta since the Social Credit landslide of August, 1935, physicians have been elected to seats in the Legislature — Dr. Walter Morrish in Edmonton and Dr. Peter Campbell in Lethbridge. Both men are well known throughout the province and will render great assistance to sane legislation. Dr. P. M. Campbell was elected on December 2, 1937.

G. E. LEARMONTH

British Columbia

As quoted by the press, speaking in the Provincial Legislature on November 9th, Hon. G. M. Weir, Provincial Secretary and Minister of Education, renewed his plea for health insurance. He explained that by "state medicine", in which he claimed to be a 100 per cent believer, he meant that the state would be responsible for complete medical, dental, hospital, nursing and other services, and would finance the whole cost of services out of consolidated revenue. He said that the people of British Columbia were spending today nearly as much on health services as would be necessary to obtain the same benefits if state medicine were in operation. Among the studies which he suggested, preliminary to introducing such measures, in an enlargement of the present Act, he included a proposal to examine the new fee schedule introduced by the College of Physicians and Surgeons of British Columbia and decide if it was reasonable in terms of fees charged in other provinces. Making comparisons with other parts of the British Commonwealth, Dr. Weir stated that the rate of pay offered to doctors in British Columbia by the health insurance commission was 75 per cent higher than the rate recommended by the doctors themselves in South Africa. In South Africa the rates per person per year were $3.42 against $6.00 in British Columbia, and the discrepancy was even greater than indicated by the figures, since in South Africa the doctors would be responsible for the certification of the insured for cash benefits, involving extra examinations and clerical work. Dr. Weir estimated the total cost of health and welfare services including tuberculosis, mental diseases, venereal diseases, hospitals and public health services at more than three and one-quarter million dollars.

With the province rapidly becoming "a convalescent hospital for the prairie provinces," Dr. Weir declared that by 1947 the cost to the citizens of British Columbia would exceed 7 million dollars in health and welfare services.

The new wing of St. Joseph's Hospital at Courtenay, erected at a cost of $85,000, was officially opened on November 10th by Patrick Phillip, former Deputy Minister of Public Works. The addition doubles the accommodation of the hospital, providing 75 beds, quarters for 14 nurses and a chapel. The old centre wing has been remodelled with the addition of one storey and sun balcony. An electric elevator serves all three floors of the old and new wings. Two new features have been incorporated for the first time in any hospital. The first is the special glass used in the operating room windows which give a perfect diffused light, and the other is a special hospital door invented by the architects.

The first unit was opened in February, 1913, by four nuns of a nursing order sent out from Toronto by request of the head of a large logging industry having camps in the vicinity of Courtenay. In 1924 the capacity was increased from 25 to 34 beds and additional room in the maternity department.

The provincial budget introduced at the present session provides $195,000 more for hospitals. Total administration of health and welfare services will advance from $66,950 to $78,140 and statutory grants to hospitals will rise from $775,000 to $960,000.

The press reports the Hon. G. M. Weir, Provincial Secretary, as assuring the Legislature that the government has not abandoned the Health Insurance Act passed last session. He is reported to have said that in the past two months a number of friendly conferences have been held with representatives of the medical profession, that there would be more of such conferences, and he was hopeful that a satisfactory solution would be arrived at. Even possibilities of state medicine might be explored by the Health Insurance Commission, and the doctors, who were now "on the spot," could not permanently thwart public opinion. He quoted a number of general practitioners as saying that 80 per cent of the population would be better off under the Act than they are at present. In reply to criticisms of the limited application of the Act he stated that not a health insurance Act in the world covers indigents.

Construction of a 200-bed private hospital in the southern district of Vancouver, where they are at present conducting a refuge for unmarried mothers and their children, is proposed by the Sisters of Charity.

On November 22nd a fire broke out in the roof of the Trail-Tadanac Hospital, but orderlies kept it under control until the fire-department, summoned by a nurse, extinguished it. So efficiently was this carried out that only slight damage was done and most of the patients in the hospital were unaware of the fire.

The Provincial Government has announced that they will no longer contribute towards hospital maintenance of aged persons or indigents who are not actually in need of hospital care under the new regulations of the Hospital Act, as described by Hon. G. M. Weir, Provincial Secretary. It is anticipated that as a result of this withdrawal of the basic rate of 70 cents per person contributed to municipalities for the care of indigent hospital patients, that municipalities will be able to place such aged and indigent persons in boarding houses and rest homes at a cost of approximately $1.00 per day instead of $3.00 or $3.50 which it costs to maintain them in a hospital. D. E. H. CLEVELAND

Manitoba

The new Forlong Memorial X-ray Therapy Department of the Winnipeg General Hospital, containing the most modern equipment in Canada for the treatment of cancer, was opened on November 21st. It is housed in a new building of concrete construction, thoroughly insulated, and contains a 400,000 volt x-ray machine and accommodation for another 200,000 volt machine. A portrait of Mrs. Grace Ann Forlong, from the brush of Haskell Coffin, is hung in the corridor of the new building. It was in her memory that Mr. John I. Forlong presented the building and equipment to the Winnipeg General Hospital. Appreciation of the gift was expressed by Mr. H. E. Sellers, Chairman of the hospital board, and by Dr. G. F. Stephens, Superintendent of the hospital. The building was dedicated by the Rev. J. W. Clarke, of Knox Church. ROSS MITCHELL

New Brunswick

Dr. J. C. Meakins and Dr. J. S. L. Brown were the special speakers at the November meeting of the Saint John Medical Society. Dr. Meakins gave a concise, thorough, interesting and instructive synopsis of the present-day thought on the diagnosis and treatment of nephritis. This address might be taken as a model for one type of extra-mural lecture, as it brings to the man living in a non-university town a quick, authoritative summary of a subject of every-day interest.

Dr. J. S. L. Brown spoke on some of the newer work in the study of sex hormones. His address was of much interest as it gave some idea of the trend of investigation along a very complicated and rather new subject. Dr. Brown's paper might be taken as the complement of the first address. All together this team of speakers provided a real treat to their listeners and both were most willing to answer questions and amplify points brought up in discussion.

The Government of New Brunswick has announced that a contract has been awarded to complete the building at the River Glade Sanatorium, originally started in 1932 for a Nurses' Home, as another unit of the Sanatorium. This will provide 56 more patient beds. The approximate cost is $57,000.00. Construction will be started immediately. Further construction at this Tuberculosis Hospital will be considered in 1938.

A most interesting event took place at the Fredericton Victoria Public Hospital recently when William Sawes Kelly was banqueted on his retirement. Mr. Kelly has given constant service to the hospital and its staff since 1896, first as an orderly, then as Laboratory Technician, X-Ray Technician, Microscopist, Bacteriologist, Analyst and Surgical Assistant. He was a man of keen scientific thought, with many slowly acquired attainments in which he demonstrated an unusual proficiency, resourcefulness, sympathy with the sick, and ability to aid the various members of the staff. It is said that Mr. Kelly made the first x-ray examinations in the Maritime Provinces at the Victoria Public Hospital, Fredericton in 1902. Dr. G. Clowes VanWart, in making a presentation to Mr. Kelly, spoke very highly of his long association with the hospital. It is some times forgotten that such lay members of a hospital staff do much to shape the destiny and to assure a good repute of the hospitals in which they work.

At a recent meeting of the Board of Commissioners of the Saint John Tuberculosis Hospital, Dr. H. A. Farris was appointed Honorary Consultant in Medicine, succeeding the late Dr. W. E. Rowley. Dr. J. P. McInerney was appointed Assistant Consultant in Medicine and Dr. Chipman McKay was appointed Assistant Surgeon.

Dr. George M. White, Saint John, has been appointed a member of the Canadian Gynæcological Travel Society. A. STANLEY KIRKLAND

Nova Scotia

The death rate for the Maritime Provinces for the year 1936 proved to be the highest in Canada. For Nova Scotia the figure was 10.7 per 1,000 of population, compared with the Dominion ratio of 9.7. The figure for Nova Scotia is lower than that of New Brunswick and Prince Edward Island, which have respectively ratios of 11.0 and 11.1 per 1,000.

An agreement has been reached between St. Rita's Hospital at Sydney and St. Joseph's Hospital at Glace Bay by which the two institutions share the services of a radiologist. Dr. H. R. Corbett, at present working at the Nova Scotia Sanatorium at Kentville, has been

appointed to the post. This appointment was made to conform to the regulations of standardization required by the Committee of the American College of Surgeons, which admitted St. Rita's Hospital recently to the list of approved hospitals.

Dr. J. P. McGrath was elected president of the Kentville Hospital Association at the annual meeting on November 27th last. The new hospital is nearing completion. Considerable progress has been made in securing funds for the new hospital.

Dr. Louis P. Robert, of the Montreal City Health Department, has been appointed medical examiner by the Canadian National Railways for the travelling clinic which will operate between Ottawa and the farthest eastern point on the Canadian National lines in the Maritimes.

Dr. S. L. Walker, formerly of Halifax and at present residing in Truro, was suddenly taken ill on November 20th. Latest reports indicate that he is making satisfactory progress.

Dr. Seymour MacKenzie, who formerly practised in Truro and later in Halifax, has returned to Truro and is now in charge of the practice of Dr. J. B. Reid during the latter's absence.

At the annual meeting of the Nova Scotia Mental Hygiene Society Professor Krug, of Mount Allison University, addressed the Society on the topic "The search for sanity". He urged the development of a Maritime Mental Hygiene Movement to interest the public in the establishment of mental health clinics and more adequate training opportunities for medical specialists in psychiatry, as well as instruction for parents and teachers.

N. B. DREYER

Ontario

The twenty-second annual clinical day of the Hamilton Academy of Medicine was attended by some 200 doctors from the city of Hamilton and outside points.

The recently published Report of Ontario Hospitals records that grants made to the general hospitals of the province for the year ending March 31, 1937, total $1,300,690.

On November 7th, the corner stone of the new wing of the Hotel-Dieu Hospital at Windsor, Ont., was placed in position with appropriate ceremony.

At the fiftieth annual meeting of the Hillcrest Convalescent Home it was decided to change its designation to "The Hillcrest Convalescent Hospital".

The Premier of the province announced at the end of November that he proposes to conduct an investigation of the wages and hours of labour of hospital employees in Toronto.

At the annual meeting of the Freeport Sanatorium, Kitchener, it was announced that the Waterloo County Health Association, which is in charge of the operation of the Sanatorium, is now free of all debt and that the new wing of the building is about completed at a cost of $64,000. Two hundred and twenty-three patients were admitted to the Sanatorium, of whom 118 were from Waterloo County. At the end of the fiscal year there were 149 patients in the hospital.

The Brant Sanatorium at its recent annual meeting reported an average of patients in residence during the year as 73.8. The 72 admissions were classified as follows: 5 juvenile, 28 minimal, 12 moderately advanced, and 27 advanced.

J. H. ELLIOTT

General

Royal College of Physicians and Surgeons of Canada.—The Annual Meeting was held in Ottawa on October 30th and the following particulars were announced in regard to the 1937 examinations and awarding of Fellowships.

Written examinations were held under the supervision of invigilators in Halifax, Quebec City, Montreal, Toronto, Edmonton and Vancouver, no candidates presenting themselves in the other selected centres.

The oral and clinical examinations were held in Montreal and Quebec.

There were 47 candidates for the Primary Examination, of whom the following 25 were successful: James Preston Robb, Westmount; Donald R. Wilson, Carleton Place, Ont.; Wilbert P. Brien, Windsor, Ont.; Cyril K. Benson, King, Ont.; Macia Campbell (Miss), Toronto; Clarence R. S. Davidson, Woodstock, Ont.; Kenneth G. Greer, Toronto; David W. P. Johnston, London, Ont.; John A. Hildes, Toronto; Stanley M. Hudecki, Hamilton; William K. Kerr, Toronto; George A. Lane, Sault Ste. Marie; David W. Lougheed, Toronto; Robert H. More, Toronto; George O. Watts, Toronto; James G. Watt, Toronto; Allen F. Graham, Toronto; Joseph G. La Salle, Quebec; Rene Letienne, Quebec; Jacques Turcot, Quebec; Arthur F. Vallée, Quebec; Joseph M. C. Bertrand, Sherbrooke, P.Q.; Paul E. Belisle, Montreal; Wilfrid Gosselin, Amos, Abitibi, P.Q.; Aime Pelletier, Joliette, P.Q.

There were 7 candidates for the final examination in the Division of Medicine of whom the following were successful: Richard Lessard, Quebec, P.Q.; Charles B. Rich, Provost, Alta.; Lewis D. Wilcox, London, Ont.

There were 11 candidates in the final examination in the Division of Surgery, of whom the following were successful: Alexander S. Allen, Kiating, Szechwan; Edmund H. Botterell, Toronto; Stuart D. Gordon, Toronto; Victor O. Mader, Halifax; Ross Robertson, Gravenhurst; William C. Whiteside, Edmonton.

Ad Eundem Fellowship was granted to Walter Ford Connell, M.R.C.P.(Lond.), 1932, Kingston, Ont. and Ralph Richard Fitzgerald, F.R.C.S.(Eng.), 1933, Montreal, Que.

The 1938 examinations will be held in October, the Writtens in numerous centres throughout Canada, and Orals and Clinicals in Winnipeg and Toronto, and for candidates in the French language in Montreal or Quebec.

Officers for the ensuing two years were duly elected and installed, and new members of Council for a period of four years.

OFFICERS AND MEMBERS OF COUNCIL THE ROYAL COLLEGE OF PHYSICIANS AND SURGEONS OF CANADA

OFFICERS: *President*, Dr. George S. Young, (Physician), 631 Medical Arts Building, Toronto, Ontario; *Vice-president*, Dr. Clifford R. Gilmour, (Physician), 275 Dromore Avenue, Winnipeg, Manitoba; *Vice-president*, Dr. William E. Gallie, (Surgeon), Medical Arts Building, Toronto, Ontario.

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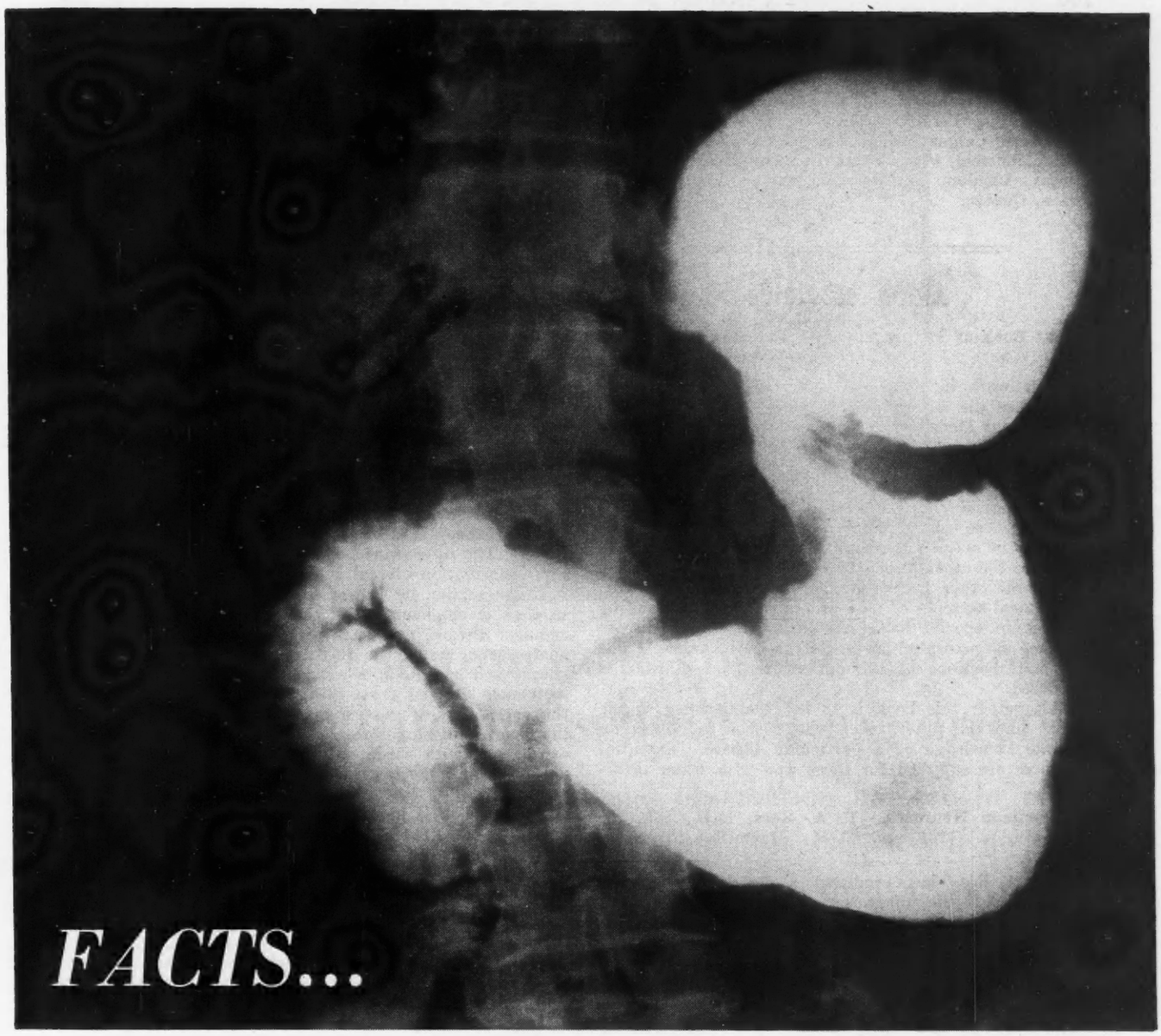

Where Early Diagnosis is Imperative

LESS than thirty years ago the diagnosis of malignant disease in regions not readily accessible to visual or manual examination was practically restricted to its late, obvious stages. But today you are not in that helpless position. . . . Instead, you have at your command a dependable diagnostic medium—radiography.

This is particularly important when carcinoma of the esophagus, stomach, small intestine, or colon is a possibility. Statistics show that approximately 50% of all fatal malignancies occur in the digestive tract, and that physical or clinical diagnostic measures are of little value in their early recognition. Radiography, however, has a high percentage of accuracy—at least 95% in cancer of the stomach.

Since early diagnosis is the prime essential in the fight against cancer, the radiological specialist is your most important ally. His radiographs and observations can provide the earliest conclusive diagnostic information . . . determine the location, extent, and probable character of the new growth . . . furnish invaluable indications as to the most effective therapeutic measures. Canadian Kodak Co., Limited, Toronto, Ontario.

RADIOGRAPHS PROVIDE DIAGNOSTIC FACTS

Book Reviews

A Text Book of Medicine. C. P. Emerson, M.D. 1296 pp., $9.00. J. B. Lippincott, Montreal, 1937.

This work introduces several unique features. In the preface the author says: "Our plan is to present International Medecine in terms of the clinical pictures of diseases, and to explain these by findings of pathology, biochemistry, and the other pre-clinical sciences, rather than to emphasize the latter, mentioning symptoms as logical consequences of disturbances in these fields". These contributions of the pre-clinical sciences are given in special paragraphs and footnotes and add greatly to the usefulness of the book.

Several other innovations are to be noted. Short biographical sketches of men who have made outstanding advances in special fields are included. Each disease syndrome is presented as a defense mechanism. The emotional reactions of the patient to his condition is considered.

Altogether this book is to be recommended to the student and the practitioner who wishes to obtain an adequate knowledge of a particular disease. Essential references are supplied for those who wish wider information.

The Common Neuroses. T. A. Ross, M.D., F.R.C.P. Second ed., 236 pp., $3.00. Macmillan, Toronto, 1937.

Doctor Ross has produced a clear and compact description of the diagnosis and treatment of the neuroses. It is a work which should be of particular interest to the general practitioner, as the type of patient described will be met with more frequently in general practice than in an institution. Many psychiatrists may challenge the dogmatic distinction between the neurotic and psychotic patient which is drawn on page 2. The author holds that "there is no real similarity between the two states". Farther on the author admits the difficulty at times in distinguishing the neuroses from the psychoses, acknowledging that some believe that the difference is one only of degree. The author believes that it is essential to distinguish the two for purposes of treatment. The danger of suicide is said to be negligible in the case of the neurotic patient, whereas it is a real danger during the depressed phase of a manic-depressive psychosis. There is a classification of the neuroses into three main groups. It is a relief to find that this classification does not require the addition of many new terms to the exhaustive nomenclature now in existence.

Practitioners who have strong views regarding Freudian psycho-analysis may be unfavourably impressed with the author's non-partisan valuation of Freud's methods in the statement that "yet it is more than doubtful whether psychoanalysis is always the best method of therapy. There are cases where it is the best, but there is a large majority where it is unnecessary and perhaps harmful, and where better results can be obtained by something much simpler. There can be little doubt of its danger, and it is possible that on the whole, as practised at present, it works more harm than good to the community. Nevertheless it must be acknowledged that the present interest in psychotherapy is due largely to Freud".

Gastroscopy, the Endoscopic Study of Gastric Pathology. R. Schindler, M.D. 343 pp., illust., $7.50. University of Chicago Press, Chicago, 1937.

The medical profession generally and gastroenterologists in particular will welcome the first comprehensive monograph on gastroscopy in the English language. Dr. Schindler's original study was published in Germany fourteen years ago. During the interval he has made 2,600 gastroscopic examinations. The interpretation of the gastroscopic appearance of the normal and diseased stomach described in this book is based on this unique and large experience.

Dr. Schindler deals with the history, technical problems, and technique of gastroscopy, which will be of greatest value to anyone interested in this subject. His chapter on the recognition and classification of gastritis, as studied by the direct method, is probably the first comprehensive study of this subject to be found in the English language. For many years gastritis has been neglected for want of positive clinical confirmation of such a diagnosis. The use of the endoscopic method has done much to clarify our knowledge of this disorder. Gastric ulceration, a subject of interest to physicians and surgeons, is discussed from the endoscopic viewpoint. The appearance of the stomach after operation is a contribution of real value.

The section on cancer of the stomach is important in that it emphasizes the early diagnosis of this very common disease, and deals with the manner in which the gastroscope assists in the differentiation between the simple and malignant ulcer. Dr. Schindler discusses the assistance derived from the gastroscope in determining the operability of gastric carcinoma. It is to be hoped that more routine gastroscopic examinations in people of cancer age with chronic dyspepsias will lead to earlier diagnosis and the institution of earlier radical surgical treatment.

This book is highly recommended to all physicians who are interested in the study of "living pathology" of the stomach.

External Diseases of the Eye. D. T. Atkinson. 2nd ed., 718 pp., illust., $8.00. Lea & Febiger, Philadelphia, 1937.

This edition has been carefully revised and brought up to date. There are many additions, chief among them being suggestions on slit lamp microscopy and on orthoptic training, together with observations relative to allergic ocular manifestations. We notice some improvement in the work, but some of the criticisms directed against the first edition, we think, still hold good. The title is open to question. Despite the precedent afforded by certain distinguished ophthalmologists whom the author mentions, we submit that the title adopted, namely, "External Diseases of the Eye", is arbitrary and artificial. External diseases of the eye are defined as "such conditions as may be diagnosed without the use of the ophthalmoscope". One might, just as well, divide surgical conditions into those which can be treated by poulticing and those which require the knife. Then, certain of the illustrations are of little value. This criticism applies chiefly to those made by photography from wax models. Some of these, notably those that deal with operative procedures, are undoubtedly useful, but where inflammatory conditions of the skin, of various kinds, are depicted the result is not good. Those who are not familiar with these conditions will hardly learn to recognize them from the pictures, while those who are will not need them. The other illustrations are mostly good and illuminating. A useful bibliography, not too extensive, is appended to the various chapters. The author deals at some length with certain affections seen in tropical and subtropical districts, as befitting his personal experience, though these are not often seen farther north. He has, wisely, included a consideration of the intra-nasal and related conditions which may

directly or indirectly involve the eye. At the end there are helpful chapters on the hygiene of the eyes, on history-taking and case records; also, on the remedies of use in the therapeutics of the eye, and there is an ophthalmological formulary.

This book will be of more use to the student and tyro than to the full-fledged specialist, but is definitely of value as giving the personal opinions and practice of an ophthalmologist of wide experience. For that reason it will be welcomed.

A Text-book of Ophthalmic Operations. H. Grimsdale, M.B., F.R.C.S., and E. Brewerton, F.R.C.S. 3rd ed., 322 pp., illust. Baillière, Tindall & Cox, London, 1937.

This textbook has been a favourite for many years. Previous editions had seemed to deal too fully with historical operations; in the present much of this matter has been judiciously pruned, and the work is more thoroughly practical and, of course, more modern.

The order in which the various topics are considered is much as before. There are twelve chapters, captioned as follows: operations on muscles; operations for ptosis; operations on the lids; operations on the conjunctiva; enucleation and its substitutes; operations on the lachrymal apparatus and bones of the orbit; cataract; after-cataract; the operative treatment of glaucoma; some operations on the cornea, sclerotic and iris; foreign bodies in the eye. The various procedures in each field are set forth in considerable detail, and a judicial appraisal of the various operative measures is always forthcoming and is one of the most valuable features of the book. The ophthalmologist can quickly, and without consulting a mass of literature, decide what will be of value to him in any given situation. The technique is made clear by numerous bold drawings of a somewhat diagrammatic character, which are altogether admirable. The various points are always given in a direct yet pleasing way. Finally, the "get-up" of the book is attractive; the paper is thick; the type is strong and clear; and, as becoming a book by ophthalmologists, the contents can be read with a minimum of eye-strain. Altogether, an admirable book for its purpose.

The Normal Encephalogram. L. M. Davidoff, M.D., and C. G. Dyke, M.D. 224 pp., illust., $5.50. Lea & Febiger, Phila., 1937.

A neurological surgeon and a roentgenologist here provide the basis for the study during life of the gross anatomy, be it normal or pathological, of the brain, meninges and cerebral vessels. The reader is informed as to the history, indications and technique of encephalography. The gross anatomy of the brain is reviewed and fully presented in terms of roentgenograms following air injections.

The object of the book is to present a fundamental thesis on encephalography based on an experience of 4,000 cases and a review of the literature. The objective has been attained, and the book will be of inestimable value to all those using encephalography as an aid in diagnosis. The excellent bibliography offers ready access to information upon all aspects of encephalography. To neurologist, neurological surgeon, psychiatrist and roentgenologist this book is unreservedly recommended.

Common Skin Diseases. A. C. Roxburgh. 4th ed., 402 pp., illust., 15s. net. H. K. Lewis, London, 1937.

With a new edition of this book the author has again fulfilled the purpose which he originally set out to accomplish, *viz.*, to provide the medical student and general practitioner with a textbook of common skin diseases "described from the point of view of diagnosis, and such treatment as the general practitioner is in a position to give". After a short introduction the author enters at once into two excellent chapters on general signs, symptoms, diagnosis and treatment, complete with carefully worded definitions of the common terms peculiar to dermatology. The various types of treatment in general usage are explained, with diet, drugs, local applications, physical methods and radiation receiving suitable attention. Twenty succeeding chapters are devoted to a consideration of the skin conditions which in the author's opinion the general practitioner may be expected to recognize and treat in the course of the daily round. Printed in an easily readable form on high-grade paper, and profusely illustrated with excellent photographs of typical examples in each instance, the book proves that the author has admirably succeeded in facilitating accurate diagnoses, on which basis alone successful treatment can be carried out. To the library of the student, the general practitioner, and the busy dermatologist, Roxburgh's "Common Skin Diseases" is a welcome addition.

Clinical Parasitology. C. F. Craig, and E. C. Faust. 733 pp., illust., $8.50. Lea & Febiger, Phila., 1937.

A book on parasitology by Dr. Craig needs no introduction. There is no doubt that we are becoming more and more aware of the fact that parasites, the prevalent etiological agents of human disease in the tropics, cause us serious concern in the temperate zones. In this volume the authors have attempted, with considerable success, to present in clear, concise form the most important facts concerning animal parasites of man; diseases which they cause and the most approved methods of diagnosis, treatment and control. The book is divided into three sections, the first of which deals with protozoa and protozoan infections, discussing clearly the class, family and genus. Each parasite is discussed under synonyms, history and nomenclature, geographical distribution, morphology, habitat, life cycle and method of reproduction, cultivation, epidemiology, methods of transmission, pathology and symptomatology, diagnosis, prognosis, treatment and prevention. The second chapter deals with helminths and helminthic infections, discussed in the same manner. Section 3 deals with arthropods and human disease. It is far the best ever presented in books of such kind and most interestingly treated.

The book closes with a technical appendix on the collection, preparation and identification of parasites and also a complete list of literature on clinical parasitology.

The book is intended not only for practising physicians but also for students in medical schools. It will be widely welcomed.

Modern Treatment in General Practice. Vol. 3. Edited by P. G. Wakeley. Editor of "The Medical Press and Circular". 436 pp., illust., $3.00. Macmillan Co., Toronto, 1937.

The first two volumes of this series were favourably reviewed in the *Journal* some time ago, but this new volume surpasses the others in every way. Articles written by men at the very top of the profession touch almost every phase of the many divisions of medicine. Some of these contributions are outstanding, such as the first three:—the surgical treatment of cancer of the stomach by Gordon-Taylor; the treatment of cirrhosis of the liver, by Sir Humphry Rolleston; and the treatment of cholecystitis, by Sir David Wilkie.

Gordon-Taylor is most frank about his lack of success in excision of the stomach, and is at a loss to account for the lower mortality on the Continent and in America. His operative mortality in 122 resections of the stomach is 34 per cent and only 9 patients lived for five years or more out of 80. Yet his mortality in gastrectomy for ulcer is only 3 per cent.

Negus (King's College Hospital) has found the most suitable treatment for carcinoma of the œsophagus is the implantation of radon seeds, 1.8 millicuries each, using the œsophagoscope and the fluoroscope, but he gives no statistics of his results.

Todd (Bristol) gives a review of his selenide system of cancer treatment. He uses a colloidal form of sulphur and selenium and is quite hopeful of improved results.

Lockhart-Mummery writes a masterpiece on the treatment of cancer of the colon, and Grey Turner another on intestinal obstruction.

The whole book is a "refresher" course from which anyone interested in medicine can gain most valuable help. There is nothing else quite like it in English.

Legal Medicine and Toxicology. T. A. Conzales, M. Vance and M. Helpern. 754 pp., illust., $10.00. D. Appleton-Century, New York, 1937.

This is a work which is of more than ordinary importance in its sphere. Written by men of recognized standing in their special field and having immense experience it may be accepted as accurate, comprehensive, dependable and practical.

There is no excessive detail. In the domain of highly specialized procedures the methods are described only sufficiently fully to impress upon the physician the nature of these examinations, their applications and their limitations, and the precautions which should be taken in any given case to ensure the success of the investigation. Pathological conditions receive more than ordinary attention, for the authors regard these as the basic considerations in the majority of medico-legal problems. Within recent years the field of medico-legal investigation has widened considerably and the book takes full cognizance of this fact. New industrial hazards are dealt with, also the newer poisons, the injuries caused by automobiles, gangsters, bombs, poison gas, roentgen-rays and radium. Finger-printing and ballistics are discussed briefly and the theory and application of the iso-agglutination tests on human blood, more fully. For the rest, the subjects usually dealt with in textbooks of this character are considered adequately. The legal aspects of the subject are not emphasized; such subjects as the corpus delicti, the various responsibilities of the physician, malpractice, insanity and insurance are discussed as problems which may arise in the professional life of any physician. A feature worthy of special praise is the free illustration.

This book is an excellent guide in teaching, not only in medical colleges but in police schools and criminological laboratories; it should be the daily handbook of the coroner, the coroner's physician, the medical examiner, the pathologist and toxicologist; it will provide a wealth of information for the internist, surgeon, those interested in occupational diseases, the legal profession and criminologists.

Drug Addiction. E. W. Adams, O.B.E., M.D. 173 pp., $2.75. McAinsh, Toronto, 1937.

This book is a compact, well-balanced monograph, giving a survey from both the medical and social aspects of a problem concerning which accurate information is desirable for the reader who is apt to be confused by the vast amount of writing on the subject. The classification and definition of addiction, with a review of the addiction drugs, is balanced by an admirable historical sketch which emphasizes the fact that a narcotic may only be assessed accurately after a long period of use. The important considerations concerning addiction drugs in which the non-expert reader will be most frequently interested — the prevalence, factors in creation of the habit, treatment and prognosis—are handled with great skill and accuracy. The medical reader will be particularly interested in the discussion of the mechanism of tolerance and the symptoms of withdrawal, the admirable discussion of the rôle of the medical practitioner in creating addiction, and the outline of treatment in which the author properly stresses the two stages in treatment, disintoxication and rehabilitation — freeing the patient from his drug and then freeing him from himself. Probably the best chapter in the book is the balanced discussion of the all-important question of prognosis, a summary of opinion which should be read by every medical man. The book provides an invaluable compendium of current opinion on a subject which is engaging the attention of the medical profession and the public in all lands at the present time.

Feeding Behaviour of Infants. A. Gesell, Ph.D., M.D., ScD., and F. L. Ilg., M.D. 201 pp., illust., $5.00. J. B. Lippincott, Toronto, 1937.

This volume is based upon an intensive study of the feeding behaviour of normal infants from birth to three years of age. Thirteen children were intensively studied and 80 less intensively, both through the Yale Clinic and through home observations. It is profusely illustrated by numerous photographs showing various aspects of the behaviour patterns.

The first section deals among other things with the motor mechanisms involved in feeding and the patterns of general development at various age levels. The middle section deals with breast, bottle, cup, and spoon feeding at various ages, and is analyzed under three headings: the adjustment to the presentation of food; the patterns of feeding; and the evidences of satiation. The last section is devoted to the regulation of feeding behaviour. It deals in a practical aspect with feeding and sleeping schedules; breast, bottle and solid feedings; weaning; thumbsucking; bladder and bowel control. The appendix consists of four cases described in detail to illustrate the above points. The authors believe that for each infant the feeding schedule, time, amount, and, to some degree, the type of food, should be based upon the child's demands and not upon a planned schedule based upon the average child. Such a routine would abolish the contest between the infant and the parent, with its emotional disturbances, and would produce a more stable child, by avoiding want, anxiety and distress. They consider that few people realize that bladder and bowel control depend upon the normal maturation of the nervous control of the bladder as well as upon the training of the child. Few parents consider the development of this control as non-emotionally as they consider the development of walking. The book is mainly of value to the psychologist, though every physician interested in infant feeding should read the chapters upon the regulation of feeding behaviour.

Biological Time. P. Lecomte du Noüy, Chief of Division of Molecular Biophysics, Pasteur Institute, Paris. 180 pp., illust., $2.00. Macmillan Co., Toronto, 1937.

The title of this book hardly indicates the appeal that its contents should have to medical readers, even apart from its main thesis. The author tells how, in France during the Great War, he arrived at his well known method of evaluating antiseptics in wound-healing. This personal account of stages in experimentation and analysis should be valuable to beginners in research, and, in spite of one or two difficult formulæ, the general medical reader will appreciate how elementary mathematics is the natural and necessary method of solving important practical problems.

For the uninitiated the reference to indeterminacy in physics is probably either too brief to be understood or too suggestive of finality among the experts, but this excursion does not occupy a central position in the argument. The discussion of relativity and concepts of time, with quotations from Karl Pearson, Bergson and others, may seem rather abstruse for many readers, but it illustrates how modern biology, even more cogently than modern physics, modifies traditional philosophy; and its important practical lesson is that astronomical time, by which we conduct our daily affairs, is not necessarily so "real" or so uniform as is commonly supposed, and that for each individual "physiological" time is more vital, the time that is measured by the activity of his tissues and body fluids. Dr. Carrel's

foreword emphasizes the bearing of this on family life, education and clinical medicine.

The subject-matter, viewed as a whole, is an answer in the Pasteur tradition to those biologists and others who despise research that is initiated to solve practical problems, and it may remind some pre-clinical teachers that in medicine the natural method of approach to pure science is by way of clinical problems.

Marriage and Periodic Abstinence. J. G. H. Holt, M.D. 174 pp., $2.75. Longmans, Green, Toronto, 1937.

This book bears only one resemblance to the Victorian novel, and that, the possession of a sub-title. In this case the secondary title is "The Natural Method of Scientific Family Regulation". Dr. Holt reviews the growth of knowledge of the relation of ovulation to the menstrual cycle and the consequent periodicity of fertility and sterility. Particular tribute is paid to the work of Dr. Kyusaku Ogino, of Japan, and to the European investigators, Knaus and Smulders. The author has been associated with Dr. Smulders in the clinical application of Ogino's theory and from this experience is able to give definite instruction as to its use as a method of contraception. He stresses the importance of the calculation of the period of fertility of each individual patient, and provides tables and a slide-rule for this purpose. The book is supplied with an extensive bibliography, and is written in a lucid and convincing style. All gynæcologists and many general practitioners will be interested in this masterly scientific exposition of what is called the "Safe Period" theory.

National Health Series. By various authors. 20 volumes, each 100 pp. Revised editions; cloth, 35c. per copy—3 volumes $1.00. Funk & Wagnalls Co., New York, 1937.

Adolescence, M. A. Bigelow; Cancer, F. Carter Wood; Common Cold, W. G. Smillie; Common Health, J. A. Tobey; Diabetes, J. R. Scott; Exercise and Health, J. F. Williams; Expectant Mother and Her Baby, R. L. DeNormandie; Food for Health's Sake, L. H. Gillett; Healthy Child, H. L. K. Shaw; Hear Better, H. G. Rowell; How to Sleep and Rest Better, D. A. Laird; Human Body, T. B. Rice; Love and Marriage, T. W. Galloway; Staying Young Beyond Your Years, H. W. Haggard; Taking Care of Your Heart, T. S. Hart; Tuberculosis, H. E. Kleinschmidt; Venereal Diseases, Wm. F. Snow; What You Should Know About Eyes, F. P. Lewis; Why the Teeth, L. M. S. Miner; Your Mind and You, G. K. Pratt.

These little volumes are written by members of the National Health Council, an organization which correlates the activities of many of the medico-sociological movements in the United States. They are intended for the laity, and admirably fulfill their purpose in giving helpful and authoritative information regarding personal and community health. Many physicians will find these books useful to give or to recommend to a patient who is intelligent enough to desire printed information about his own condition. No attempt is made to encourage self-diagnosis or self-treatment, and the volumes largely avoid that cardinal sin of the doctor who writes for the lay reader, namely, "talking down". This list covers the field which was contemplated for the "What You Should Know About" series started under the auspices of the Canadian Medical Association, and which came to an untimely end after the publication of four volumes. The sensible and reasonable opinions expressed by the authors in "Common Cold" and "Exercise and Health" call for particular commendation.

Personality and the Cultural Pattern. J. S. Plant, M.D. 432 pp., $2.50. Commonwealth Fund, New York, 1937.

Dr. Plant attempts to summarize here the interreactions between the personality and the cultural milieu in which the individual lives. The fact that environmental influences determine to a large extent human behaviour has, of course, been accepted by those whose primary interest it is to deal with abnormal behaviour. It is probably true, however, that the physician who attempts to treat mental disorder has over-emphasized the importance of defects within the personality structure of the patient and minimized the rôle played by the social environment. The extensive clinical material and social data presented in this book clearly illustrate the point of view set forth. The first part of the book is devoted to a discussion of the changing concepts of the personality and the personality-culture balance. Then follows a discussion of the results of the conflict between personality needs and various environmental pressures. Particular emphasis is placed on the family, the school, and the social problems in urban areas as related to personality development. The author's social philosophy as presented here, his emphasis on the results of preventive efforts in this field, and his discussion of the significance of psychogenic illness should make this book particularly valuable to the medical profession.

Our Children in a Changing World. E. Wexberg, M.D. and H. E. Fritsch. 232 pp., $2.00. Macmillan, Toronto, 1937.

In this book the authors attempt to portray some of the commoner behaviour problems in children. They discuss in considerable detail the treatment of such symptoms as anxiety, fears, feeding problems, disturbances of speech, and other manifestations of maladjustments in children. Numerous case illustrations are used to exemplify the methods of treatment advocated. The authors indicate in the introduction to this book that their approach to the treatment of child problems is essentially that of Adler's "Individual Psychology". This accounts for the frequent over-simplification of the facts involved in many of the problems discussed and the rather superficial treatment procedures employed. There are numerous helpful suggestions which should be of special value to those who are particularly interested in the treatment of children.

BOOKS RECEIVED

The History of the Acute Anthemata. J. D. Rolleston, M.A., M.D., F.R.C.P., F.S.A., Medical Superintendent, Western Fever Hospital, London. 114 pp., $2.25. Wm. Heinemann, London; Macmillan, Toronto, 1937.

Physicians and Medical Care. Esther L. Brown, Department of Statistics, Russell Sage Foundation. 202 pp., $0.75. Russell Sage Foundation, New York, 1937.

Paget's Disease of the Nipple. Keith Inglis, M.D., Ch.M., Professor of Pathology, University of Sydney. 233 pp., illust., $11.00. Oxford University Press, London; McAinsh, Toronto, 1936.

Clinical Electrocardiography. Sir Thomas Lewis, M.D., F.R.S., D.Sc., LL.D., F.R.C.P., C.B.E. 6th ed., 128 pp., illust., 8s. 6d. net. Shaw & Sons, London, 1937.

Emotional Adjustment in Marriage. Le Mon Clark, M.S., M.D., Assistant in Obstetrics and Gynæcology, University of Illinois. 261 pp., $3.75. McAinsh, Toronto, 1937.

The Harvey Lectures. Delivered under the Auspices of the Harvey Society of New York. Series 23. 245 pp., $4.00. Williams & Wilkins, Baltimore, 1937.

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